

HITCHCOCK'S Machine Tool BLUE BOOK

FOUNDED

FEBRUARY 1939

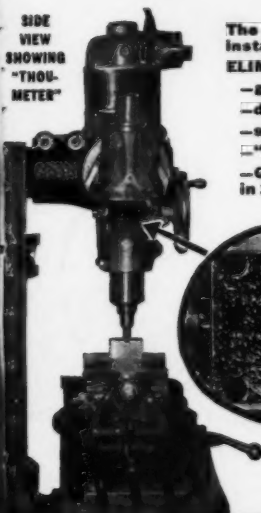
1905

Presenting the
DALRAE MIDGETMILL
with the new **"THOU-METER"**
(Patent Applied for)
for setting End Mills
by DIRECT READING

FRONT VIEW
OF
MIDGETMILL



SIDE
VIEW
SHOWING
"THOU-
METER"



The "THOU-METER" gives
instant zero setting—
ELIMINATES

- graduations
- dials
- stops
- "Mistakes"
- Guaranteed accuracy
in $2\frac{1}{2}$ " travel $\pm .00025$ ".



CLOSE-UP
VIEW OF
"THOU-METER"

The DALRAE High Speed
Universal Milling Attach-
ments—

**Speedmill and
Midgetmill—**

"The End Mills' Best Friends"

Fit the overarm of any mill-
ing machine.

Write for new 16-Page catalog.

DALRAE TOOLS CO.

501 E. WATER STREET

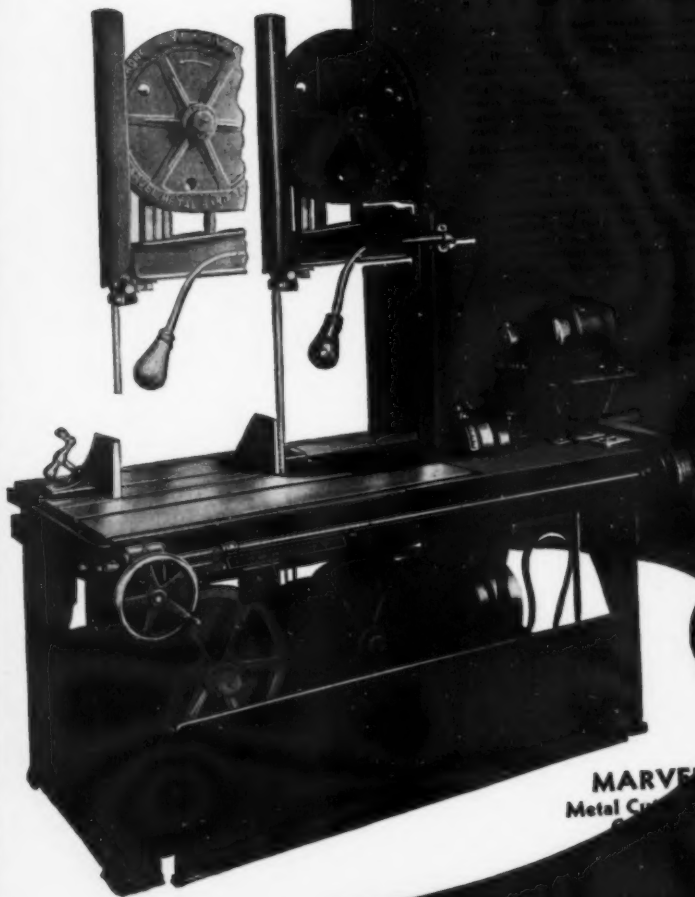
DURHAM, N.C.

IMPORTANT

MARVEL

S.F.

UNIVERSAL



MARVEL
Metal Cutting Machine



IMPORTANT

**—To Users of Tungsten Carbide
Reduction In Price On Tungsten
Carbide By WILLEY'S**

THE FACTORY BEHIND



THE PRODUCT

Effective as of Jan. 1, 1939, Tungsten Carbide prices are based at 35¢ a gram. "Willey's" are able to make this reduction due to their manufacturing of Tungsten Carbide Metal from the powdered materials to the finished product under their patent Nos. 2,133,495, 2,074,038, 1,702,765, and 1,702,766 (other patents pending).

*Catalog M23 Is Just Off The Press
Write For Your Copy TODAY.*

WILLEY'S CARBIDE TOOL CO.



Rivett Tool Room Bench Lathe

The simple plain open head bench lathe has many advantages in toolroom work. Jobs are more easily set up, more quickly completed, and more accurately finished than if done on heavy, single-purpose machines. The open cone aids in setting up, hand turning and indexing work. Complete variety of attachments enables a wide range of accurate operations on small metal parts.

The Rivett plain precision open head tool room lathe is furnished with bronze spindle bearings in five headstock sizes ranging from $\frac{1}{2}$ " to $1\frac{1}{4}$ " collet capacity. Anti-friction ball or roller spindle bearings are optional. Simple counter-shaft drives or complete unit motor drives with mounting equipment are available.

New bulletin 505 sent free on request.

RIVETT LATHE & GRINDER INC.
BRIGHTON, BOSTON, MASS.
PIONEERS IN BENCH LATHE DEVELOPMENT



Only 11 Different Parts
in the
GLENCO
Compensating Tool Holder

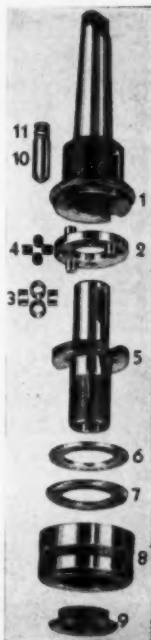
The simplicity of this modern aid to accurate drilling, reaming and tapping is emphasized by the illustration at the right—showing the 11 different sturdy parts which comprise the GLENCO Compensating Tool Holder.

*Utility
Tools*

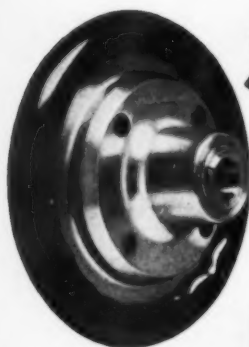
As all parts are hardened and ground, wear is negligible and repair or service units fit correctly in holders which have seen extended service.

GLENCO Holders automatically compensate for spindle misalignment and eliminate the oversize and bellmouthed holes which otherwise cannot be avoided with inaccurate machine tools—errors that cut deeply into profits through wasted time and parts that have to be discarded.

Five standard sizes of holders with taper or straight shanks, capacities up to five-inch tool diameters, are carried in stock for immediate delivery. Special or larger than standard holders will be made up promptly. Our Engineering Department is ready at all times to assist you in solving your special problems.



The J. C. GLENZER CO., Inc.
6465 Epworth Blvd., **Detroit, Mich.**



SJOGREN

PRODUCED (SHOWING)

SPEED COLLET CHUCK

For Your Tool Room and Engine Lathes

- Saves Time
- Increases Capacity
- Eliminates Keys and Wrenches
- Increases Production
- Affords Greater Accuracy
- Three sizes up to 1 3/4" Capacity

"Saves Time and Increases Accuracy"



In use on Milling Machine

In use on Engine Lathe

The amazingly fast action of the Sjögren Speed Collet Chuck gives it full right to its name! An almost effortless turn of the handwheel, one way or the other, automatically opens or closes the collet, releasing or gripping the work as desired. Its grip is adjustable and sure. Most operators simply lay a hand on the wheel and run the lathe forward to tighten the collet . . . reverse to loosen.

METHOD OF MOUNTING: An intermediate plate is used to adapt the Sjögren Speed Chuck for machines with threaded nose spindle. It is mounted in the same manner as an ordinary 3 or 4 jaw chuck. Also, it is furnished complete, ready for use with machines having standard tapered key-drive or cam lock spindles.

With the Sjögren Speed Collet Chuck, the operator is always in front of his work and he stays there! There is no need to reach over—or to walk back of the lathe headstock—to grip or release material in the collet.

Through the increased production and machinist efficiency caused by the elimination of lost time and lost motion, the Sjögren Speed Collet Chuck more than pays for itself! Write today to the nearest distributor or use Quickmail Coupon No. 3.

FURNISHED WITH HARDINGE PRECISION COLLETS

• DISTRIBUTORS •

Ray H. Morris & Company, Inc.	7 South Main Street	West Hartford, Conn.
Hardinge Sales Company, Inc.	277 Lafayette Street	New York, New York
Wright & Gade Equipment Co.	3701 North Broad Street	Philadelphia, Pa.
Hardinge Brothers, Inc.	1418 College Ave.	Elmira, New York
W. W. Wentz	113 Powers Building	Rochester, New York
William K. Stamets	Jenkins Arcade Bldg.	Pittsburgh, Pa.
Cleveland Duplex Mch. Co., Inc.	Penton Building	Cleveland, Ohio
E. A. Kinsey Company	331-335 W. Fourth St.	Cincinnati, Ohio
Iverson & Laux	544 W. Washington Blvd.	Chicago, Illinois
F. A. Durnell	709 Carlisle Place	Indianapolis, Indiana
National Sales Engineering Corp.	2970 W. Grand Blvd.	Detroit, Michigan
Northern Machinery & Supply Co.	Lumber Exchange Bldg.	Minneapolis, Minn.
Colcord Wright Mch. & Supply Co.	1223-1229 N. Broadway	St. Louis, Missouri
C. H. Gosiger Machinery Co.	Bacon & McDonough Sts.	Dayton, Ohio
Moore Machinery Company	550 Fifth Street	San Francisco, Calif.
Eccles & Davies Machinery Co., Inc.	1910 Santa Fe Ave.	Los Angeles, Calif.

SJOGREN MANUFACTURING COMPANY


DRAW-IN COLLETS

FOR YOUR LATHES AND MILLERS

HARDINGE

COLLETS SINCE 1890

DRAW-IN COLLETS FOR ALL LATHES AND MILLERS



PROMPT
DELIVERY
FROM
STOCK

FOR
— ACCURACY —
— DURABILITY —
— ATTRACTIVE PRICES —
"SPECIFY HARDINGE COLLETS"

Refer To Inside Pages For Your Requirements
Purchasing and Engineering Departments. Keep This List for Reference Purposes

Hardinge Collets are in stock for immediate delivery. Hardinge Collets embody
those elements of precision which have characterized our products since 1890.

HARDINGE BROTHERS, INC., ELMIRA, NEW YORK

*Send Quickmail Coupon No. 2 for this bulletin No. 37
if you have
LATHES and MILLERS*

HARDINGE COLLETS: for American, Ames, Boye & Emmes, Carroll & Jamieson, Chard, Cincinnati, Cisco, Dalton, Flather, Greaves-Klusman, Hamilton, Hendey, LeBlond, Monarch, Porter-Cable, Pratt & Whitney, Rahn Larmon, Reed-Prentice, Rivett, Rockford, Sebastian, Seneca, Sidney, South Bend, Springfield, Stark, Sundstrand and our own Hardinge Cataract Lathes.

HARDINGE COLLETS: for Ames, Becker, Burke, Pratt & Whitney, Reed-Prentice, Rockford, Stark, Sundstrand, Van Norman and our own Hardinge Cataract Millers.



Bulletin No. 37 gives complete information; dimensions of standard collets; lists attractive prices; makes ordering easy. Gives location of collet stocks in six important centers in the United States.

—SPECIFY HARDINGE COLLETS—

HARDINGE BROTHERS, Inc.,

Elmira, N. Y.

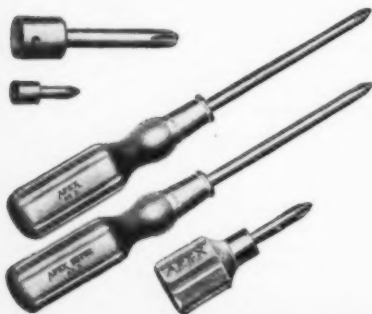
APEX

POWER BITS  HAND DRIVERS
for General Purpose and Super
Phillips and Slotted Screws  Service for Phillips Screws

POWER BITS

Apex-Phillips Power Bits cover the entire range of Phillips screws and in design to fit all makes of electric, air and spiral drivers. Made from special shock resisting steel, heat-treated and tempered to give the maximum in hardness, toughness and wear resistance.

Apex Power Bits for Slotted Screws are made to fit all makes of electric, air and spiral drivers and range in size from No. 4 to No. 16 screws. Don't overlook the substantial savings made by having Apex-Phillips Power Bits reconditioned when worn out.



HAND DRIVERS

Apex-Phillips Hand Drivers are General Purpose and Super Service types. The Super drivers are especially recommended for case-hardened and self-tapping screws. "Stubby" hand drivers are also made in both types. Immediate deliveries on all standard Phillips and Slotted Screw Power Bits.

Phillips License No. 2

Patent Nos. 2046837-38-40

See our Exhibit
A. S. T. E. Convention
BOOTH A-58

The APEX MACHINE & TOOL Co.
Dayton, Ohio



COSTS GO DOWN!

...when you
grind raised
welds

with SKILSAW DISC SANDERS

Try them on your toughest weld grinding or cleaning work . . . and you'll find that SKILSAW Disc Sanders will not only save you considerable time and labor, but will do the job better and easier! Use SKILSAW Disc Sander with cup grinding wheels (up to 6 in. diam.) and watch the spot and raised welds just melt away before its rush of grinding power that leaves the surface as smooth and clean as you want it. Made in 3 models, for use with grinding wheels, wire brushes, polishing pads, etc. on flat, concave and convex surfaces of metal, wood, stone, marble, tile and composition.

SKILSAW, INC.

5035 ELSTON AVE., CHICAGO

214 E. 40th St., New York—52 Brookline Ave., Boston—1429 Spring Garden,
Philadelphia—2124 Main St., Dallas—1253 S. Flower St., Los Angeles—
2065 Webster St., Oakland—Canadian Branch: 85 Deloraine Ave., Toronto.

Sold by leading distributors of mine, mill, hardware and contractors' supplies



NO *Blower* OR *Air* REQUIRED WITH THE **HOLDEN** *Atmospheric* *Pot Furnace . . .*

OUTSTANDING ADVANTAGES

- 1 Low fuel costs. High value heat insulation.
- 2 Low investment. Installation cost under \$10.
- 3 No electric power required to operate blower.
- 4 Simple automatic control (one valve).
- 5 Control provides accurate temperatures to plus or minus 5° F.
- 6 Requires less supervision.
- 7 Uniform hardness when used with Holden Baths.
- 8 Complete installation guaranteed by The A. F. Holden Company.



**Holden
Atmospheric
Pot Furnace**

Original cost of complete installation with automatic controls approximately $\frac{1}{2}$ less than air operated furnaces.

Temperature range—300 to 1650° F.

Manufactured, natural or liquified gas may be used.

Send for folder showing prices and sizes.

THE A. F. HOLDEN COMPANY, NEW HAVEN, CONN.



HOLDEN BOOKS



HOLDEN BATHS

Recommended for

Holden Atmospheric Pot Furnaces

Temperature ranges 300 to 1650° F.

CASE HARDENING

Holden Light Case 100
Holden Light Case 200
Holden Light Case 300
Holden Hard Case 400
Holden Hard Case 500

BLACKING STEEL

Holden Black Finish
S-10 or 100
Tempering Steel
Tempering-310A or 3-12

INCREASED HIGH SPEED TOOL LIFE

50-500% with HOLDEN HY-
SPEED CASE

ANNEALING NON FERROUS OR PRECIOUS METALS

Holden Low Temperature Anneal
Holden Anneal 5-14
Holden Anneal 800
Holden Anneal 975
Holden Anneal 1000

NEUTRAL HARDENING BATHS

Holden Hardening 8-15
Holden Hardening 11-18
Holden Hardening 1000

TOOL AND DIE HARDENING

Holden No-Carb.

HOLDEN EQUIPMENT

Holden produces equipment and baths including Ceramic pots for temperatures 1500° to 2400° F. Uses: Hardening Hy-Carbon, High Chrome, or Air Hardening Steels; Stainless Steel, Hot Forging Dies, High Speed Steel, or other alloy steels, No scale.



HOLDEN RESEARCH

today provides you with baths proven by industry—these baths reduce costs from 10 to 20%. Mail attached card or write letter for engineering cooperation.

THE A. F. HOLDEN COMPANY, New Haven, Conn.

Let HOBART Prove it Can

KELLERFLEX

Below:—Chamfering an elliptical hole—a better job and a 50% saving over hand filing. The Kellerflex JB-0 Machine (shown at right) is ideal for this. It has speeds from 900 to 9000 R.P.M.



Use power filing for these jobs

Power filing is rapidly replacing hand filing in metal working shops. Modern practice calls for burs and rotary files in connection with flexible shaft machines, portable drills or stationary machines. Other operations include power filing of bronze, brass and aluminum castings, dies,

molds and patterns. This is the ideal method for finishing "hard-to-get-at" places. For full information on flexible shaft machines, and for bur shapes and sizes, write to the Kellerflex Sales Department, Pratt & Whitney, Division Niles-Bement-Pond Co., Hartford, Conn.



PRATT & WHITNEY

*Jim,
Our own men can
operate this Hobart Welder.
And 30 Days Trial
should show us whether
it's the solution to our
production problems.
Let's get in touch
with Hobart Phil*

Let HOBART Prove it Can CUT Your WELDING COSTS

You Get Them All In a Hobart



REMOTE CONTROL. A time-saving feature that permits and encourages your operators to use the right welding heat at the right time.

FAN VENTILATION. (End to Center). Specially designed fan draws in fresh air at the ends and expels it at the center, changing the air twice as often as end-to-end cooling, assuring a far longer useful life.



MULTI-RANGE DUAL CONTROL. Provides 10 welding ranges with 100 full multi-amperes adjustment, making 1,000 combinations of voltage and current instantly available... without a single "dead spot".

EXCITATION. Oversize, four-pole exciter assures quick reaction to changing conditions in the welding circuit and makes it possible to avoid commutator troubles. Eliminates frequent polarity reversals.

SUPERIOR STABILIZATION.

In oscillograph comparison with other welders, Hobart shows stabilization in all ranges, assuring a uniform current with all electrodes.



Hobart speeds production, gives better welding of all types of work, is more economic

Hobart Saves You Money

while giving you the advantage of better welding on all types of work. Every feature of the Hobart 40 Volt Simplified Arc Welder has been created with just one thought... to CUT COSTS ON QUALITY WELDING!

The Hobart Simplified "Multi-Range" Arc Welder is the biggest money-maker you can

add to your shop! With Hobart's exclusive features, you get a better quality product while getting faster welding at a lower cost.

To PROVE to your satisfaction that you can't afford to be without Simplified Arc Welding try a Hobart for 30 Days... at no risk! It saves money while it pays for itself.

HOBART BROS. CO., Box TB-29, Troy, Ohio

"One of the World's Largest Builders of Arc Welders"

MODELS, 8 SIZES TO CHOOSE FROM



THE NEW "MULTI-RANGE"
DUAL CONTROL

HOBART

BEST SELLING ARC WELDER ON THE MARKET TODAY

30 Days Trial

Try Hobart at our risk on your own work with no obligation. You'll save a lot and you can prove it on your own job.

FREE!
YOUR NEW
HOBART
CATALOG



Hobart Bros. Co., Box TB-29, Troy, Ohio

Without obligation send me full information about the Hobart "Multi-Range Dual Control" Arc Welder particularly on the items checked below:

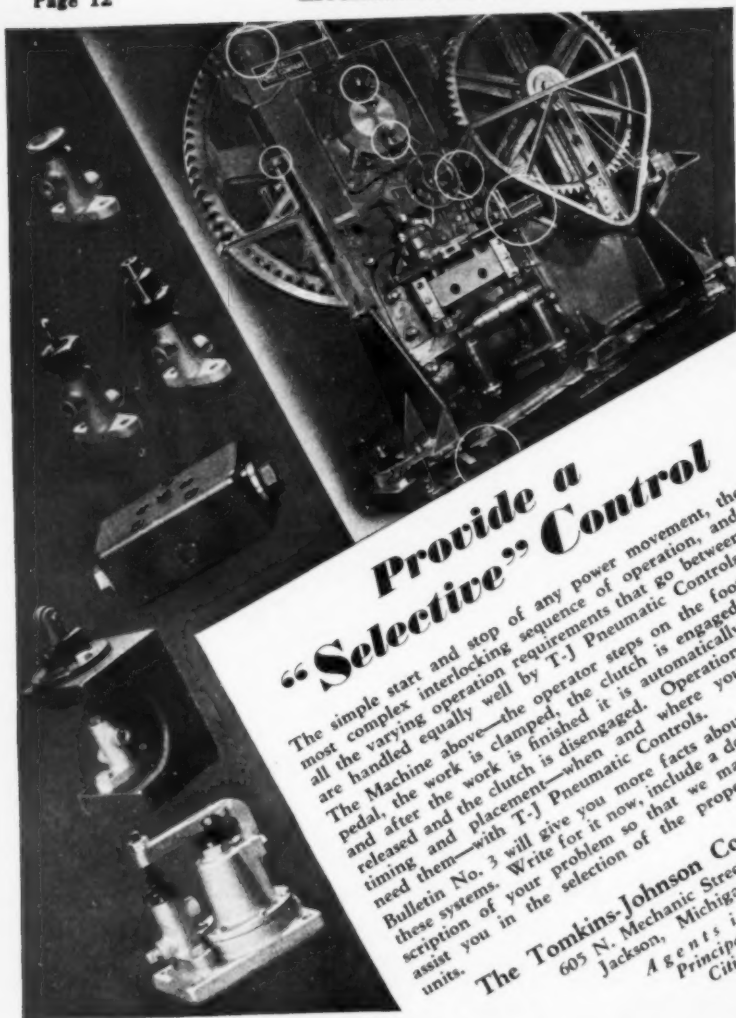
☐ Electric Drive ☐ Gas Drive ☐ "Build Your Own"
I'm interested in _____ Amp. Capacity
To be used for _____

Also information on ☐ 30 Days Trial ☐ Easy Terms ☐ Rental Terms

NAME _____ FIRM _____

ADDRESS _____

CITY _____ STATE _____



Provide a "Selective" Control

The simple start and stop of any power movement, the most complex interlocking sequence of operation, and all the varying operation requirements that go between are handled equally well by T-J Pneumatic Controls. The Machine above—the operator steps on the foot pedal, the work is clamped, the clutch is engaged, and after the work is finished it is automatically released and the clutch is disengaged. Operation, timing and placement—when and where you need them—with T-J Pneumatic Controls. Bulletin No. 3 will give you more facts about these systems. Write for it now, include a description of your problem so that we may assist you in the selection of the proper units.

The Tomkins-Johnson Co.
605 N. Mechanic Street,
Jackson, Michigan
Agents in
Principal Cities

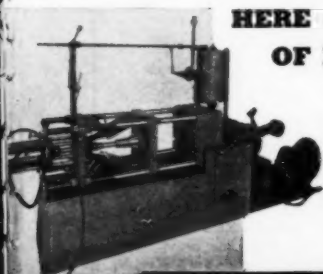
REMOTE **T-J** CONTROLS
PNEUMATIC

Die-Casting this part saved 88.15%!

Here is an actual case history which conclusively shows the great economies possible through the use of a Harvill Die-Casting Machine. Even though only 500 were produced this part was reduced from a sand cast and machining cost of \$128.72 to a die-casting cost of \$15.25 . . . a net saving of 88.15%. It may be possible to effect similar savings in your shop by installing a Harvill Hi-Pressure Die-Casting Machine . . . low in first cost, low in operating costs . . . faster and safer in operation. Investigate at once!



HERE ARE THE COMPARATIVE COSTS OF MACHINING AND DIE-CASTING . . .



MACHINING

Cost of pattern.....	\$.32
Cost of Sand Casting.....	8.40
80 hours machining to finish, @ \$1.50 per hour.....	120.00

Total.....\$128.72

DIE-CASTING

Cost of die.....	\$ 3.00
Completed casting ready to assemble	12.25

Total.....\$15.25

This comparative cost is based on the production of 500 parts, with pattern and die costs completely charged off on this quantity.

economical
is available
Write for

H. L. HARVILL *Incorporated*

If You Make Metal Rings or Cylinders - -

A "Buffalo" WRAPPING ROLL

Will Pay Big Dividends

● Every day our engineers and our customers are finding new and money-saving uses for Buffalo Wrapping Rolls. Many parts that were formerly cast, are now rolled at considerable saving in both labor and materials.

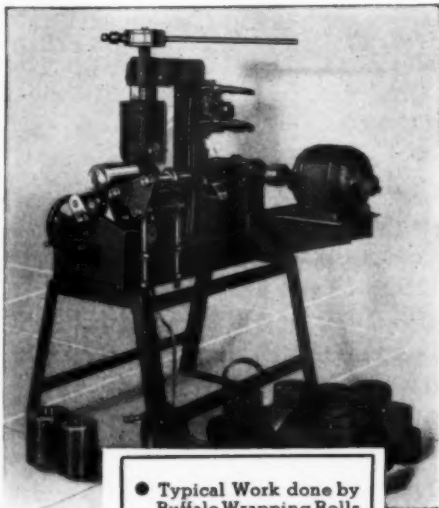
All but the heaviest work is produced in a single pass of the material through the rolls. Completed work is removed from rolls without disturbing the set-up or adjustment.

Sizes available to handle thicknesses from $\frac{1}{16}$ " to $1\frac{3}{4}$ ". Write for our new Bulletin 3150 which gives complete information.

BUFFALO FORGE CO.

161 Mortimer St., Buffalo, N. Y.

Branch Engineering Offices in Principal Cities
In Canada: Canadian Blower & Forge Co., Ltd., Kitchener, Ont.



- Typical Work done by Buffalo Wrapping Rolls
- Gear Rims
- Static Rings for Electric Motors
- Motor Frame Shells
- Pipe Couplings
- Ring Gears
- Small Tanks
- Steel Pulley
- Rims
- Reinforcing Rings
- Roller Bearing Races
- Generator Bodies
- Roller Bodies and Similar Objects.

"Buffalo" WRAPPING ROLLS

COSTS MORE DOES MORE *Worth the Difference!*

Beginning with the very materials with which it is made, The Haskins Tapper justifies its higher *original* cost. Manufactured almost entirely in the Haskins plant by specially developed methods and machines, it combines construction and design features not to be found in any other tapper. It is more finely engineered—thus more capable of *precision* performance.

What does this mean in terms of *your* tapping problems? The fastest *precision* production you have ever obtained. Longer machine life and dependability. Less "down time." Greater labor efficiency. Less tap breakage and fewer spoiled or rejected parts. In short—increased output at lower unit costs.

With all these advantages it is not surprising that the Haskins Tapper *does* cost more—nor that it is proving itself *more than worth the difference!*

COMPLETE ENGINEERING SERVICE

The specialized tapping experience of Haskins Engineers is always available to every user of The Haskins Tapper. Through this complete engineering service, which helps you find the simplest and most efficient way to handle *every* tapping job, you are certain of getting *out* of your Haskins Tapper all the superior performance *built into it!*

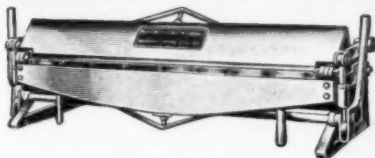
A FREE BOOKLET—"Precision Tapping at High Speed"—gives complete details about The Haskins Tapper and the uniquely efficient Haskins Tapping Method. Write today for your copy. No obligation. R. G. Haskins Company, 623 S. California Avenue, Chicago.



HASKINS PRECISION *Tapping Equipment*

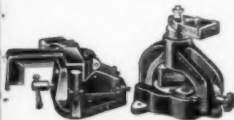
WHITNEY TOOLS

The Whitney Line comprises more than 80 types of Shears, Punches and tools for sheet metal working—sturdy, dependable tools for practical workmen.



No. 4 Angle Iron Shear

Capacity 2"x2"x¼" angle iron or smaller.

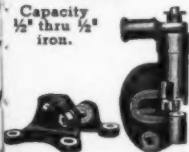


Angle Mitre Notcher and Angle Iron Bender

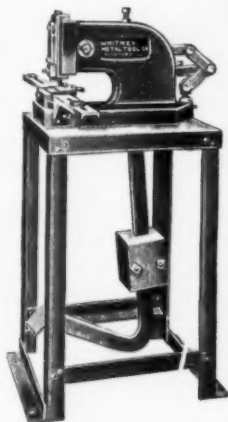
Capacity 2"x2"x¼" angle iron or smaller. A pair of tools that every shop ought to have. They are Nos. 50 and 51 in our catalog.

No. 20 Ball Bearing Punch

Capacity ½" thru ½" iron.



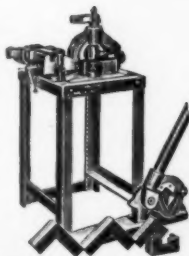
The Whitney JENSEN Portable Brake weighs only 265 lbs., and takes up to 49-inch widths in 20-gauge material, with ample clearance at both ends of jaws for folded-up edges. Equipped with quick-acting turnbuckle adjustment for different thicknesses of metal. Makes reverse bands as short as 3/16-in. Graduated angle indicator on apron hinge lugs. Has every feature of a standard brake.



Whitney Foot Presses are made in four sizes—Nos. 28-9 with 7 and 10-inch throats respectively—Nos.

58 and 68 with 18 and 24-inch throats. Capacity, 2-inch hole in 16-gauge. Double angle notching punch and die supplied at a reasonable extra cost. Several customers state these punches promptly paid for themselves.

Write for a copy of the complete Whitney catalog.

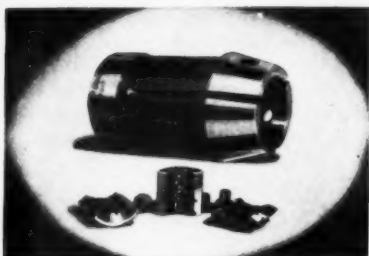
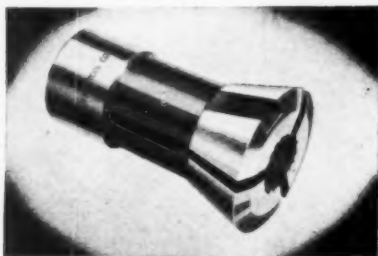


No. 455 Angle Iron Combination

Capacity 2"x2"x¼" Angle Iron or Smaller

WHITNEY METAL TOOL CO.
ROCKFORD, ILLINOIS

QUICKLY RECOGNIZED



Sutton **DIAMOND-GRIP** Collets

◆ ◆ ◆ ◆ ◆ You can always recognize a Sutton **DIAMOND - GRIP** Collet at a glance. Its clean-cut diamond-shaped serrations are an exclusive and distinguishing feature.

◆ The performance advantages of **DIAMOND SERRATIONS** are also quickly recognized by production managers responsible for the cost and quality of screw machine products, and also by the operator of the machine.

◆ **DIAMOND SERRATIONS** grip tighter under less tension, clear themselves of dirt and chips, and cut down spoilage, due to slipping.

◆ For a complete display of **DIAMOND-GRIP** Collets and other Sutton screw machine accessories visit the Sutton booth at the A. S. T. E. Show, Detroit, March 14 to 18. For your reference file send for complete Sutton Catalog.

SUTTON TOOL CO. 2842 W. Grand Blvd., DETROIT, MICH.



Only Sutton Diamond-Grip Collets are Diamond - Serrated

KRW Hydraulic and Sensitive ARBOR PRESSES

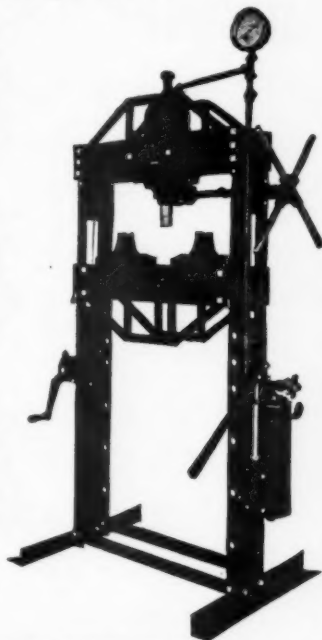
New Improvements, Special Built-in Features and Lower Prices make them an outstanding value.

THE last word in convenience, efficiency and ease of operation. Built extra strong and well braced, with steel trusses electrically welded, these presses will withstand strains that would cause presses of lighter and inferior construction to buckle or collapse.

Hand wheel for sensitive press operations has sliding handles which pull out to the ends for increased leverage. Work does not have to be changed from the work table as is the case with other make presses having a separate sensitive press unit mounted on the side or elsewhere.

The importance of this KRW feature as a time and labor saver can be appreciated. Also there is **NO EXTRA CHARGE** for this important built-in feature on a KRW Press. Work table can be raised easily with one hand. A strictly one-man Press.

Write for literature giving full details and specifications of all KRW Arbor Presses.



PRICES F. O. B. FACTORY, ARCADE, N. Y.

No. 37—35 ton Hydraulic and Sensitive Arbor Press.....	\$150.00
No. 37E—50 ton Hydraulic and Sensitive Arbor Press.....	180.00
No. 37F—70 ton Hydraulic and Sensitive Arbor Press.....	300.00
Gauge and fittings, \$15.00 extra on all presses.	

K. R. WILSON

10-16 Lock Street, Buffalo, N. Y., U.S.A.

Export Department

90 West St., New York, N. Y.

West Coast Branch

722 Mateo St., Los Angeles

Cut Handling Costs . . ***with*** **JOHNSON'S *Multiduty* DIE TRUCK**

With a MULTIDUTY, one man can easily separate dies weighing 1000 pounds or more. In addition, a MULTIDUTY performs all the conventional duties of an ordinary truck.

MULTIDUTY eliminates drudgery in the Tool Room, Die Vault, Press Room and in any other section of your plant where heavy loads have to be transferred, raised, lowered or supported.

The sturdy, rigid construction of MULTIDUTY assures long, useful service. Simplicity and ease of operation makes it practical for any plant.



CHECK THESE OUTSTANDING ADVANTAGES:

1. Makes die separation and assembly an easy one man job.
2. Adjustable table eliminates heavy lifting.
3. A practical work bench with overhead hoist.
4. Easy separation and turning of heavy parts.
5. No complicated adjustments.
6. Rigid welded construction.
7. Easy rolling.
8. Conventional truck.
9. Adjustable sliding spools taking up to 40-inch width.
10. Adjustable punch holder clamps.

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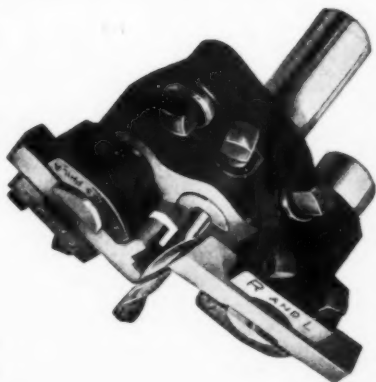


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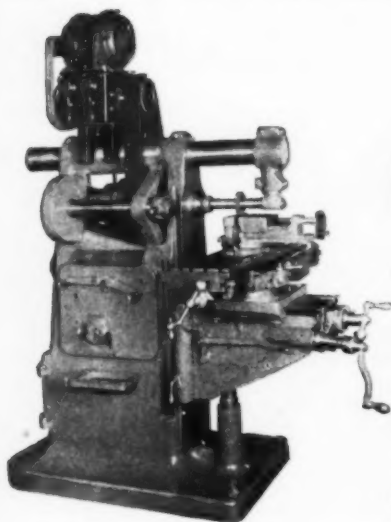
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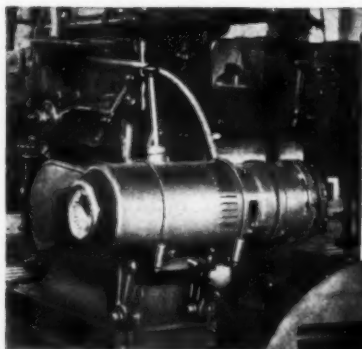


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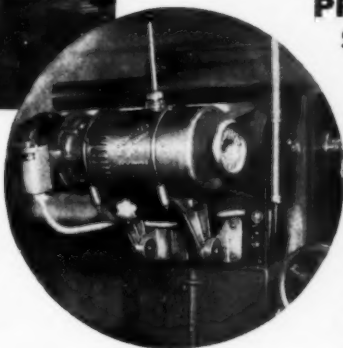
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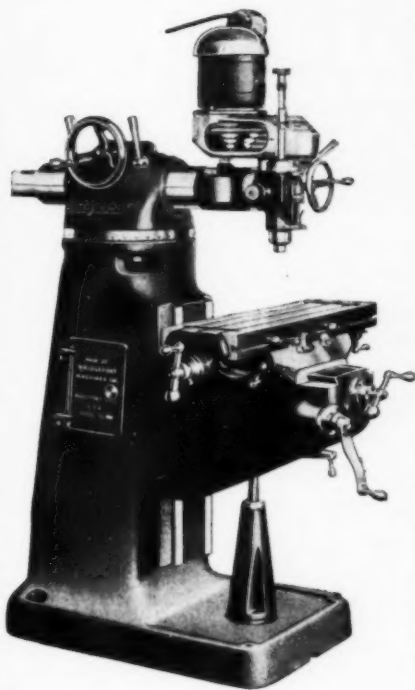
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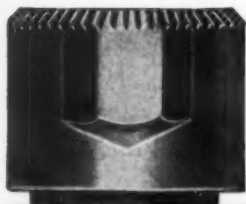
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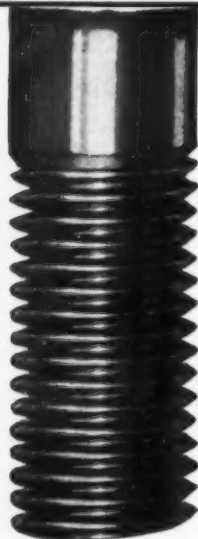


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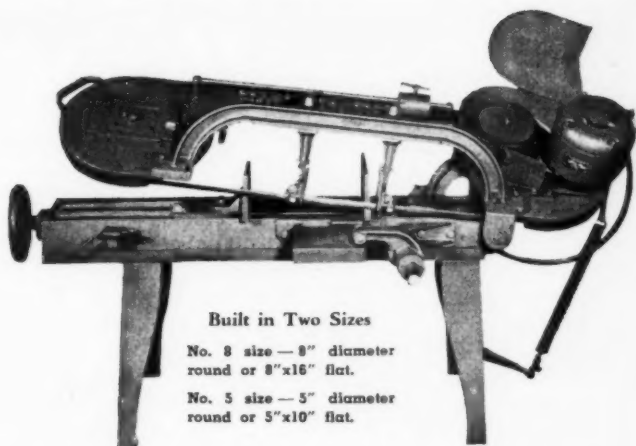
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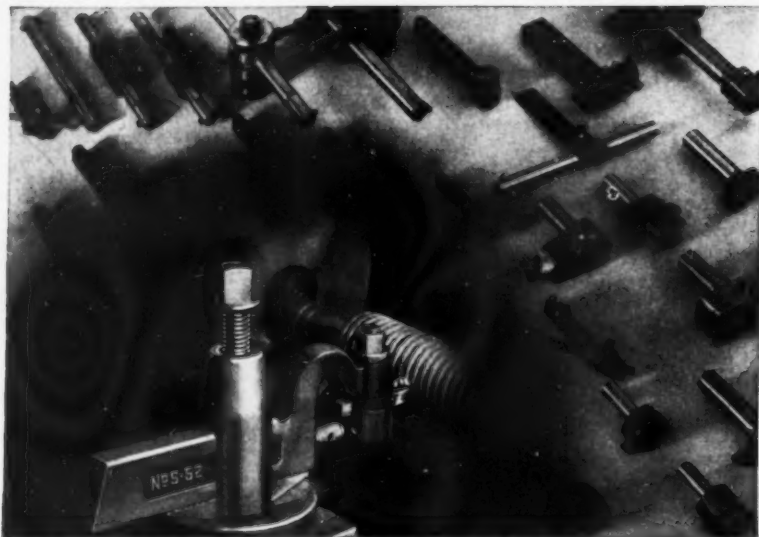
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The Editor's Page

The recent birthday anniversaries of Ben Franklin and Bobbie Burns recalled some of their inspired writings . . . brimming with sound, homely philosophy that would prove helpful if studied more in these troubled times.

Franklin's homespun wisdom and sense of initiative and enterprise represent the psychological foundation upon which this nation was built. In Poor Richard's Almanac you will find many guideposts and gems of inspiration and experience at variance with modern streamlined theories and tendencies. To mention just a few:

"Drive thy business or it will drive thee.

"Employ thy time well if thou meanest to gain leisure.

"If you know how to spend less than you get, you have the philosopher's stone.

"Industry pays debts, despair increases them.

"Diligence is the mother of good luck.

"Beware of small expenses; a small leak will sink a great ship."

Burns, the plow-boy poet, has been an inspiration to the Scottish people. You'll find running through his verse, threads of sound, sensible advice and a keen understanding of human nature. Just recall his lines about seeing ourselves as others see us . . . the inspiration for which was said to have been a tiny mite crawling upon a fine lady's collar . . . or the tiny field mouse and her brood, accidentally plowed up, which suggested his observation about the best laid plans of mice and men going astray.

Each of these great men left his imprint in the thoughts of men . . . and the world is better because they lived.

Getting On . . .

Why do some men get *on* in business while others make little or no headway?

The man on the street will probably credit progress to "getting the breaks". Occasionally promotion may result from opportunity or good luck. More often though it is the result of perseverance, intelligence and industry.

A fellow starting in on a job may measure up a little smaller . . . or a little bigger than the opportunity. Unless he has the right stuff, he may fall into the routine and soon be doing just enough to get by. Or he may keep his eyes and ears open and keep several steps ahead of his job. Eventually, he'll attract attention and win promotion.

Modern business provides opportunities for expansion of capabilities . . . for development of interest and initiative. The employee who makes slow progress is usually the fellow who stints on performance . . . who studiously avoids doing more than he was hired to do. There's always room higher up for the cheerful, industrious fellow who gives daily proof of the fact that he is bigger than the job.

A.S.T.E. Exhibition . . .

Mark this on your calendar . . . the opening of the big Machine and Tool Progress Exhibition at Detroit, March 13th.

From all reports, the Show this year should eclipse the highly successful session last year. Already, twice as many exhibits have been booked, as were shown last year. At the rate business is coming in, it will not be long before space will be "sold out".

The exhibits afford an exceptional opportunity to see what the development of machines, tools and methods is doing to improve production and reduce costs . . . to add sales appeal to products and to create new jobs . . . to unfold new opportunities and to elevate living standards.

The question isn't whether you can afford to attend the Show . . . but whether you can afford to miss it.

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● These are but a few of the many stories that come to us every day, proving the advantages of using Ryerson Certified Steels. Since this higher uniform quality can be purchased without increased cost, we believe it will pay you to concentrate with Ryerson. Remember the steel is in stock and Immediate Shipment is assured. Joseph T. Ryerson & Son, Inc. Plants at: Chicago, Milwaukee, St. Louis, Boston, Detroit, Cincinnati, Cleveland, Buffalo, Philadelphia, Jersey City.

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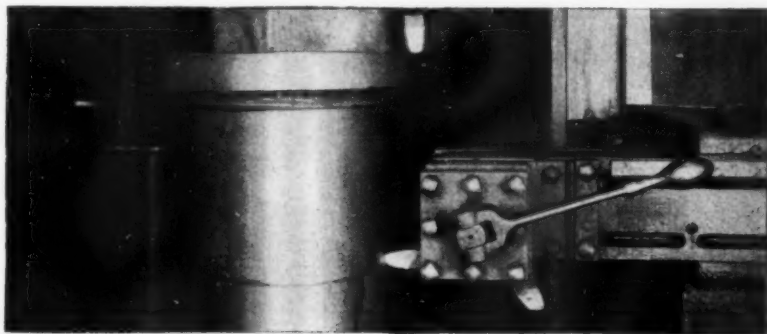


Fig. 1—Turning and Facing semi-steel hub centers.

Cemented Carbide Tools on Job-Lot Machining Work

by E. C. Howell
Carboloy Company, Inc.

BECAUSE of the emphasis that has been placed upon the value of cemented carbides as a "mass production" tool, many of the smaller machine shops may have acquired the impression that quantity production is a prerequisite of economical cemented carbide tool use.

Likewise, the unusually high order of performance of cemented carbides on new, rigid, specially-powered machines has tended to create the impression that cemented carbides will not prove satisfactory on old machines.

Carboloy Widely Used on Old Machines

It is true, of course, that quantity production performed on new, specially built machines is the ideal condition under which to get the greatest savings from cemented carbide tools. Under such conditions, cutting speeds, feeds, tool set-ups, periods between grinds, and many other factors can be adjusted gradually so that ideal conditions prevail and maximum savings are obtained.

However, it is also a fact that sub-

stantial savings are being made on small run jobs and on older machines. A survey shows that approximately 60% of all metal working machines in use today are 10 years old or over. It has been our observation that in excess of 75% of all Cemented carbide tool applications are on these older machines and that on a substantial number of these the production is in the classification of job-lot, limited quantity work.

An excellent example of the saving possible is the application illustrated in Fig. 1. This job, turning and facing 20 semi-steel hub centers, was previously run with high speed steel tools at 40 feet per minute, $\frac{1}{16}$ " feed and $\frac{1}{2}$ " cut. In this shop, most of the machines do not permit a large increase in speed, so that economical use of cemented carbide tools depends upon longer tool life between grinds with a subsequent reduction in tool grinding time and tool set-up time. In some cases, a nominal increase has been possible. On the application illustrated it was possible to increase the

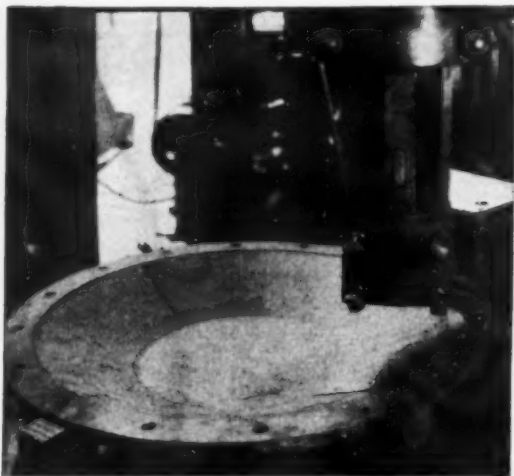


Fig. 2—Facing lower halves of cast iron diaphragm pots.

speed from 40 feet per minute to 103 feet per minute and maintain the same feed and depth of cut. Under these conditions, the cemented carbide tools completed the entire lot of 20 pieces without requiring grinding. This factor, plus a decrease of 1 hour machining time per piece resulted in a saving of approximately \$54.00 for the entire lot of 20 pieces.

Machining a 16-Piece Lot

Another example of savings made on small quantities is the application shown in Fig. 2. This job, facing the lower halves of cast iron diaphragm pots, involved a total quantity of 16 pieces. High speed steel required 35 minutes per piece or $9\frac{1}{4}$ hours to complete the job, running at 90 f.p.m. Cemented carbide tools reduced the machining time to 25 minutes per piece or a total saving of $2\frac{3}{4}$ hours for the lot, running at a speed of 144 f.p.m. Additional savings were obtained by increasing the tool life per grind from 3 to 16 pieces. Total saving effected by the cemented carbide tool on this job was calculated to be about \$6.00.

It will be noted that in neither of these two cases was the increased performance of a "sensational" nature. Neither of these is comparable to the large savings reported on quantity - production jobs and where machine conditions are ideal. Yet in both cases the savings obtained under restricted conditions, and on small runs, were

worthwhile. Nor are these isolated cases. Rather, they are typical examples of the ways in which smaller companies and job shops are effectively using cemented carbide tools to their advantage.

In reviewing the foregoing examples, many may raise the question as to what happens to the cemented carbide tools after the small job for which they were originally obtained is completed. Obviously, the tools in both cases still have the greatest portion of their original life still remaining to be used. Where else can these be applied?

General Purpose Tool Design The Answer to Use on Job-Lots

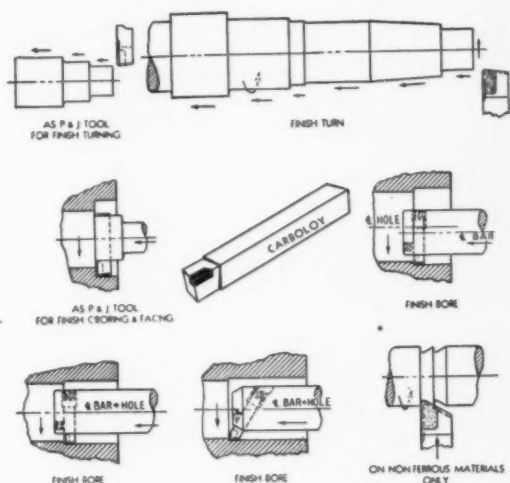
The answer to this question in many cases is first that the tools in a large majority of cases more than justify their original cost on their first job,—and theoretically at least, were they thrown away upon completing the job, they would still be economically justified.

However, for all practical purposes,

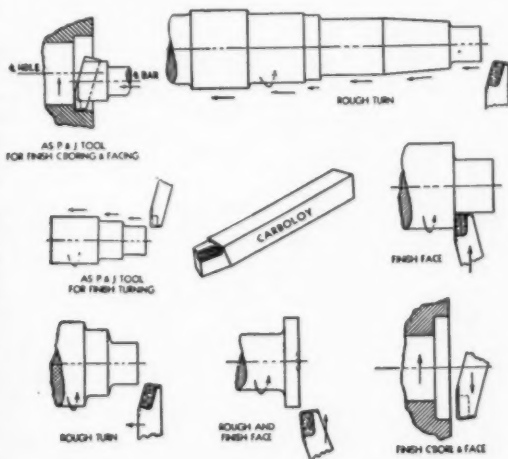
Fig. 3 — A versatile tool for general purpose use.

the answer lies in designing the tools so that they are of a general purpose nature and can be applied on a wide range of work. Fig. 3 is an excellent example of the flexibility of a tool designed for general purpose use. It will be seen that this tool can be used to turn, face, bore and counterbore, and is suitable for use on engine lathes, turret lathes and boring mills.

Another flexible tool is that illustrated in Fig. 4. This tool can be used for rough turning, finish facing and numerous variations of combination counterboring and facing operations.



A slight revision of this same general type of tool is illustrated in Fig. 5. In this case the tool can be used for finish turning, facing, boring and counterboring.



There are, of course, many other possible general purpose designs but these few examples will serve to indicate the possibility of designing tools that have a wide range of use on a diversity of work. The problems of each shop vary, but it is a safe assumption that if the average run of work in each case is analyzed over a period of time, it will be found that in most instances a few general purpose cement-

Fig. 4 — A flexible many-purpose tool.

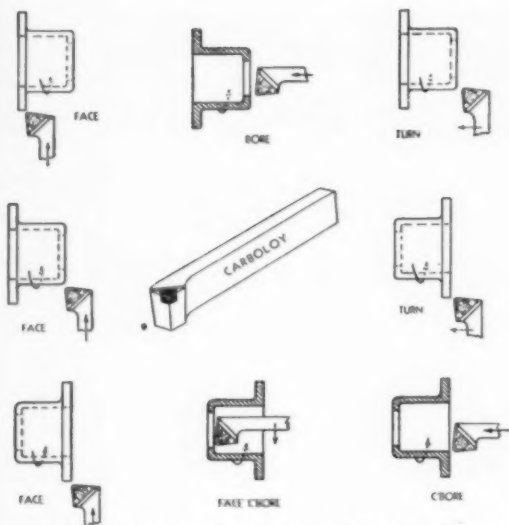


Fig. 5—This tool may be used for finish turning, facing, boring and counterboring.

seem paradoxical in the face of the fact that most cemented carbide suppliers — ourselves included — have a wide selection of grades available. In our own case — which we cite simply as an example — there are more than a dozen grades available embodying either tungsten carbide, tantalum carbide, titanium carbide or a combination of one or more of these carbides.

However, the problem simplifies itself for the small shop when it is

realized that grade selection is important principally to the plant with large-quantity production machining operations. In other words, variations in grades are designed principally to meet certain production conditions and increase production to the maximum under those conditions. For example, on a job from which the desired production is 1000 pieces during each 8-hour shift and when the particular cemented carbide grade used requires grinding after each 900 pieces, it is obviously desirable to experiment with grades until one is found that will stand up for the entire 8-hours. This is, of course, just one example of the many requirements that must be met on quantity production jobs. Obviously, the particular problem cited would be of no interest to the shop machining 20 pieces per lot. Similarly, in most cases the problems arising from quantity production jobs — problems justifying a wide selection of grades — would be simplified in the smaller plant into the problem of selecting one general grade for cast iron and non-ferrous metals and one grade for steel.

ed carbide tools can be designed for their economical use on a number of jobs.

The problem of proper grade selection may seem to be a retarding factor to many small shops having limited quantities to machine. Due to the wide selection of grades offered by the cemented carbide tool suppliers, many may feel that each job should have a "tailor-made" grade of carbide to do the job right. If this were the case, obviously this would seriously handicap the selection of a few general purpose tools as the problem would then be one not only of tool design but also tool grade.

Carbide Grade Selection is Simplified for Job-Lot Shop

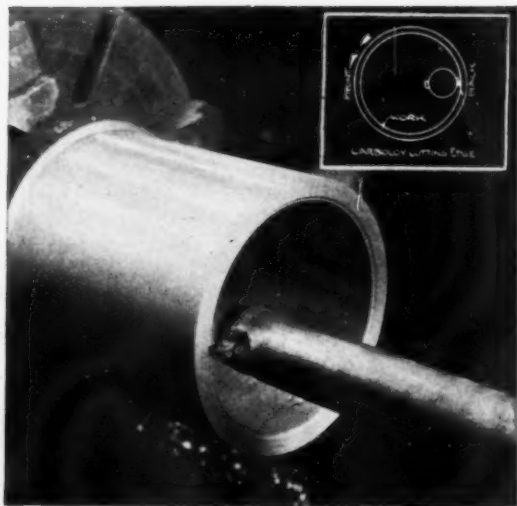
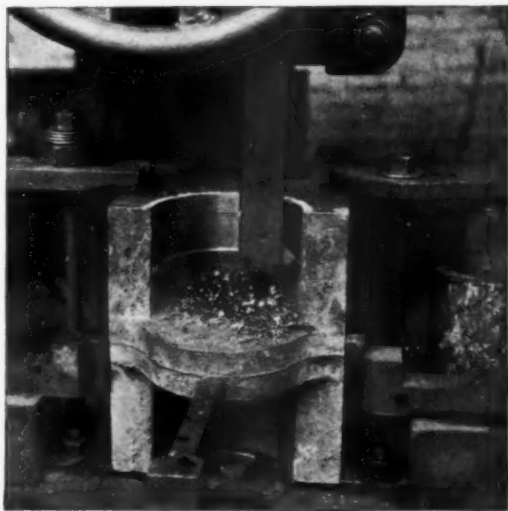
However, in actual practice the problem of grade selection becomes a very simple one when it is realized that more than 75% of all existing cemented carbide applications are satisfactorily performed with just a few grades. In our own case, one grade alone is satisfactory for a large percentage of the applications. This may

be of no interest to the shop machining 20 pieces per lot. Similarly, in most cases the problems arising from quantity production jobs — problems justifying a wide selection of grades — would be simplified in the smaller plant into the problem of selecting one general grade for cast iron and non-ferrous metals and one grade for steel.

Fig. 6—Improvised set-up on old vertical boring mill.

**Cemented Carbide
Not a "Prima
Donna" Material**

Too much emphasis cannot be placed upon the fact that cemented carbide is not a "prima donna" material—that is, cutting material that has to be "pampered" and "jolted along" to get results. When cemented carbide was introduced, it was publicized as a new material requiring special handling and unusually ideal conditions in order to perform properly. This was justified to a certain extent in



order that those in the metal working trades would fully realize the definite requirements to be met if the best results were to be obtained. However, with the spread of this initial word of caution, the limitations "snow balled" into a veritable mountain of restricting conditions until there was established a definite belief that almost the slightest jar would chip the cemented carbide cutting edge and that absolutely ideal con-

Fig. 7—A set-up that invited chatter—and a suggested improvement.

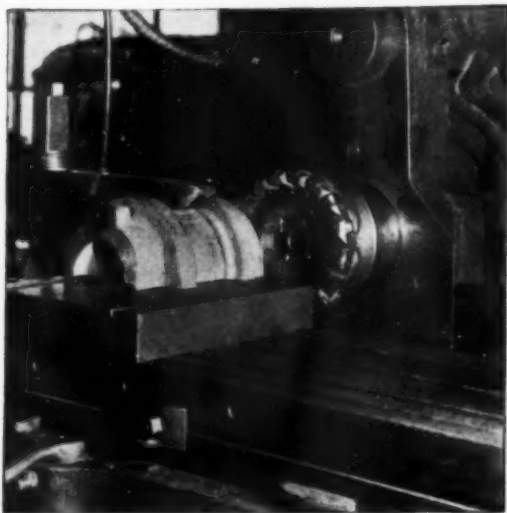
Fig. 8—Successful application in an old milling machine.

ditions were vital to the success of this cutting material.

In somewhat modified form, this belief still prevails in many shops, and because of this there are many applications on which cemented carbide could be used to effect extremely worthwhile savings, now passed by because conditions are not "ideal".

To dissipate this lingering belief, the accompanying illustrations are submitted. In each case the operating conditions are bad, very bad—yet in each a substantial saving in time and money is being made. Fig. 6 shows a makeshift set-up on an old vertical boring mill. Ask any tool engineer familiar with cemented carbide tool requirements and he will tell you that the boring bar is not sturdy enough and is excessively long. He'll also suggest that the tool overhang is too great. However, the shop superintendent will tell you that this set-up did the work and saved money.

In Fig. 7 a somewhat similar con-



dition prevails to perhaps a greater extent. This chattering set-up could have been improved somewhat in accordance with the inserted sketch by cutting on the opposite side of the work with the tool operating upside down to take up the play. However, the job "paid-out" despite the tool spring and chatter that was experienced.

In Fig. 8 the defects are not obvious but on this particular job the milling

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Face of slide, r to l, St'd.....	12½"	12½"	13"
" " Maximum.....	24	24	34
" " front to back.....	48	60	60
Die space.....	42	48½	48½
Stroke.....	2	2½	3
Throat.....	25	28½	34
Face of table, front to back.....	46	60	64
" " r to l, St'd.....	22	22	28
" " Maximum.....	30	34	38
Capacity.....	200T	300T	400T
Shipping weight, lbs.....	42,000	57,000	74,000
Motor required, H.p.....	7½	10	15

Spacing table to suit requirements

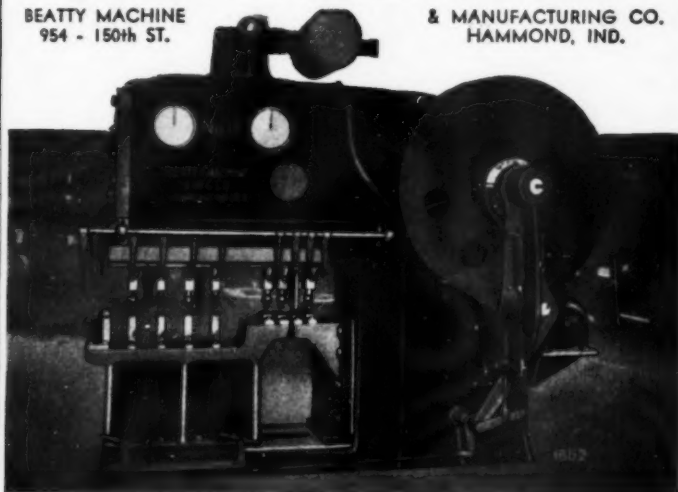
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machine was 20 years old and had at least a $\frac{1}{4}$ " play in the table. Despite these handicaps the 6" Carboloy-tipped milling cutter is being used successfully and is, in fact, making the somewhat staggering saving of \$2,500.00 annually through reduction in machining and cutter grinding time.

The above examples are not given to encourage the promiscuous use of Carboloy tools under undesirable conditions. However, they are intended

to emphasize the fact that cemented carbide is not the extremely delicate cutting material that many still believe it to be. Experience has shown that it can be used with a reasonable chance of success under adverse conditions.

Naturally, this is not intended to imply that ideal conditions are not desirable whenever possible in the application of Carboloy tools. It is, of course, obvious that the degree of savings obtained increases with the degree to which ideal conditions are provided. However, as pointed out, this should not discourage the use of cemented carbide tools when the best operating conditions cannot be obtained. For those whose shops fall in this classification and who are not now using cemented carbides as fully as they might, there awaits an extremely attractive field of profitable use.



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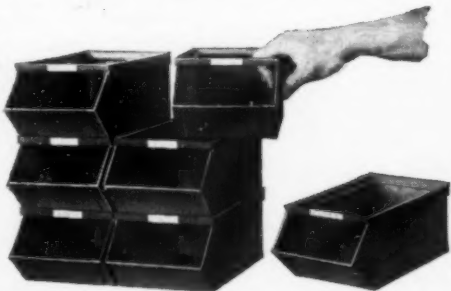
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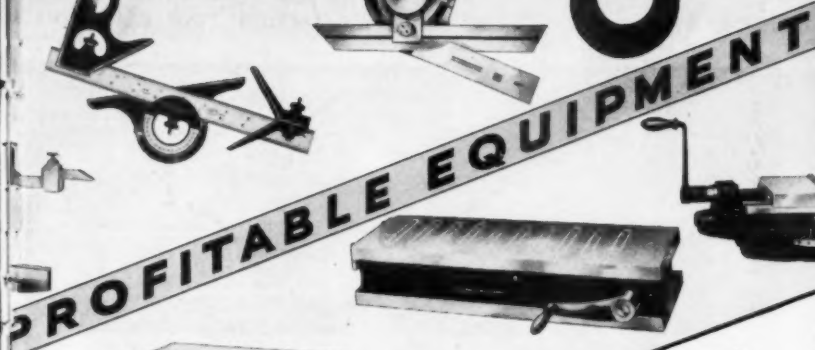
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To Keep Planes Aloft

A HUGE, glistening American Airlines plane gently swoops down on the field of the Chicago Municipal Airport. It gracefully taxis to a stop. Passengers are disgorged to go their various ways. Pilots and stewardesses come into the offices. The trip is over.

Here is General Headquarters, where executive offices, general overhauling division, publicity offices and the base of American Airlines are established. The line's 50 planes, flying almost 7,000 miles of air route in serving nearly 60 cities from Boston to Los Angeles, are all overhauled here.

About every 5,000 flying hours, each ship is given a complete overhauling—for 2,000 employees of the airline depend on the perfect conditioning of these planes for their livelihood.

In charge of the manufacturing division of American Airlines is Mike Kerry, personable, former industrial teacher, and authority on welding. Under him are 45 men whose job is to keep the planes in perfect condition — from helping with the repair of delicate instruments to handling structural parts and battery repairs.

Mike tells us that

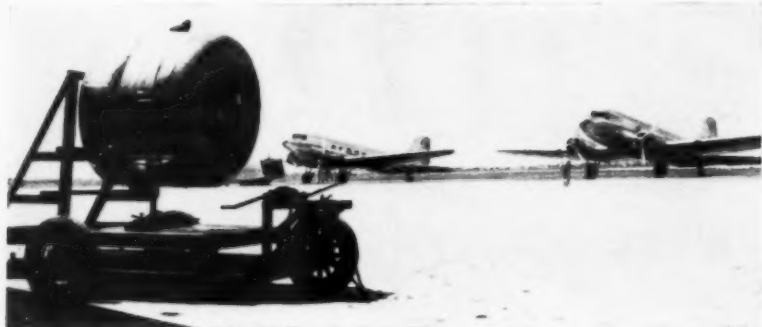
the Airlines have largely changed from acetylene to arc welding on jobs sufficiently heavy to withstand the heat. He takes boilers as an example. Arc welding, he explains, gives them longer life and better field service at reduced production cost. The company has had virtually no difficulty with its stainless steel tubular boilers since the installation of the new arc welders.

These are Lincoln verticals, which handle all arc welding operations. By arc welding, they say 50 per cent has been gained in speed, thanks to the saving in time formerly required for preheating the metal. Mike uses titanium welding rods for stabilizing

the chromium alloy in the metal. As he explains it, the precipitation resulting from the use of a titanium welding rod in repairing stainless steel is one of titanium carbide which permits the alloys, that give the metal its strength, to retain their full tenacity and integrity in the material.

The binder pass for arc welding is formed with a $\frac{1}{8}$ inch rod, usually, and heavier rods are used for finishing the welding. Mike recommends the use of small rods when pos-





sible, because their ready flow furthers speed and a firm weld.

No spot welding is handled in the repair shop, although many of the smaller operations, such as repairing side brackets, are handled by gas acetylene welding. Exhaust pipes and thin wall tubing are also gas welded.

Some brazing is done on internal fixtures. Silver soldering is used for repairing strut heads and instruments.

The motor, of course, comes in for the lion's share of attention. Its nine cylinders, capable of generating 1,150 horsepower, are individually tested. First the parts of the motor are given a bath in a solution of Turko cleaner to dissolve bindings and oil cakes.

To test the cylinders, a Wright Cylinder Head tester is used. Each cylinder, by this process, is filled with oil and the oil is subjected to an hydraulic pressure of 2,000 pounds per square in. This shows up weaknesses and cracks in the cylinders by forcing the heads off or forcing oil to seep out through fractures in the bodies.

For other parts, magnetic machinery is used in combination with a grinding compound solution to test for cracks. This Magnaflux method of testing requires the placing of the section being tested between two electrodes. The part is magnetically charged with all the power it will hold. The magnetized piece is placed in an agitated bath containing charged particles of Mag-

naflux. After it has been in the bath the proper period of time, the part is removed and examined for a visible line of the Magnaflux particles which forms along any fractures.

If a broken unit is found, the part is either repaired or replaced, depending on the nature of the trouble.

After the test is completed, the parts are demagnetized by being passed through a powerful alternating current field. Small parts may be passed through hastily and are almost instantly demagnetized. Larger parts are kept in the coil for proportionately longer periods of time.

Most of the parts for Douglas planes—since the entire American Airlines fleet is of Douglas manufacture—are kept in stock to replace those that are outworn. But many of the plane parts are still of adequate strength and need only regrinding, resizing or possibly replaced bushings. Therefore the machine shop is fully equipped for the working of stainless steel, tool steel, duraluminum, brass, bronze and any of the many other materials that are used in plane structure.

Grinding is extensively employed in the repair base to further the high standards of accuracy demanded in aviation. In the general machine shop works, the standards of accuracy are, when necessary, kept within 1/1000th to a quarter of a 1000th of an inch.

We find the extreme in the aviation scientific instrument repair laboratory where tolerances run as low as $1/10,000$ th of an inch.

Nicks are removed from propeller blades by grinding and polishing with a United States Electric Tool Co., grinder. The propellers are made of forged aluminum. The grinder is operated on a flexible shaft by an expert workman who employs carefully selected cutting materials for the correction of minor flaws in the blades. Blades are held in a special fixture rigidly. For final polishing operations, a soft, canvas-bound polishing disc, impregnated with tallow and carborundum, is used.

A Heald No. 50 cylinder grinder brings many parts down to the requisite fraction of a thousandth of an inch in accuracy. It is used to grind gear drives for propellers and many other

parts, with various types of grinding wheels. A Luxite wheel is used on the hard-to-grind cylinders because they're of nitrated steel. Softer wheels are used for gears and other parts. Compensation for the dimensional reduction is made by the use of oversize oil seal rings.

Cylinder barrels are honed and polished with hones. Exhaust valve seats are handled on a Stellite grinder made by the Waddell Engineering Corporation. A surface grinder which gives 8 to 12 thousandths of an inch cold clearance is used on piston rings.

A new Van Norman tooling apparatus for reworking and overhauling engine gear wheels and braking supports has been recently installed. Parts are ground on the wheel so as to bring them within the proper limits of accuracy and concentricity. The extremity of polishing fineness in the plant is



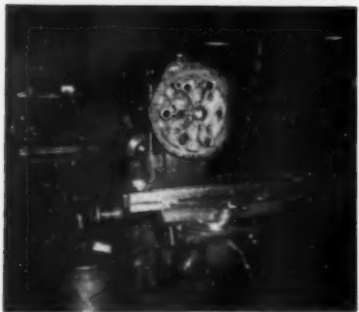


Illustration at top shows a Lincoln Welder. In the center is a view of the Magnaflux Tester. Below is shown a Kearney & Trecker Milwaukie Milling Machine.

found in the use of Alumina for polishing the most delicate parts in the instrument repair division. Alumina leaves no scratches.

For grinding, many special fixtures have been built by the repair shop to speed the setting-up of grinding operations. Special reamers and fixtures, tools for particular jobs, tools for holding parts and other labor-saving, work-improving devices are manufactured in the airline base. Typical of these jigs is one consisting of two blocks of tool steel between which the part to be machined fits. Apertures in both blocks guide tools with precision down the dead center of the part being repaired. Before the jig was constructed, the parts, which cost around \$17 apiece were thrown away. Now the parts can be re-machined, fitted with over-size oil rings or bushings, and returned for many flying-hours of use.

Three W. F. & J. Barnes drill presses are used for a variety of work in the repair division. They are of different sizes and fit an assortment of functions. The smaller press is used for boring bushings in connecting and making rods. Larger presses handle much of the cylinder reconditioning work and are used to replace valve guides and intake valve seats. Spark plug bushings are also replaced on the large drill press.

Most of the boring, reaming and broaching of the holes made by the drill presses is handled on a Kearney & Trecker "Milwaukie" milling machine. This machine accommodates a 48-inch piece easily. Starter shafts and many other parts are finished and worked on it. Bushings are usually fitted into the refinished parts. Some of the bushings are of bronze. A high proportion of lead is often employed, when the bushing does not require extreme hardness, since lead furthers smooth, easy machining and is an invaluable help to lubrication. Cams, too, are handled on the Milwaukie machine by means of special jigs.

Atlas Engine Lathes and other, smaller, ones are used for gears and

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No. 3 Hand Millers—Ideal for rapid, low-cost milling of parts for business machines, electrical instruments, fire arms, gauges, small tools and experimental work within their capacity. They are easy to set up, simple to operate; accurate, rigid, dependable. Also available in column-type.

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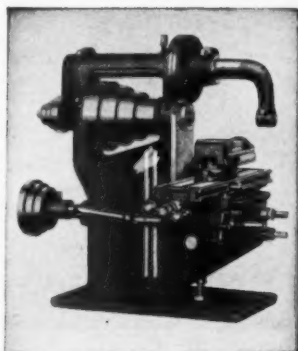
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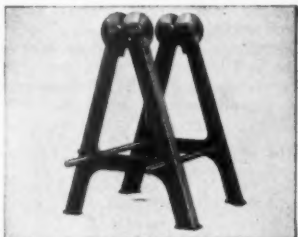
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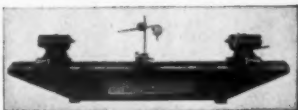
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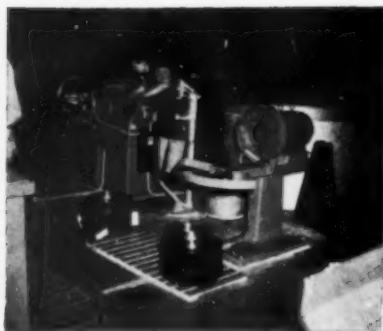


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the threading of special parts such as oversize studs. A special jig is used for operations on pistons. The sides of the piston are aligned and straightened up and the pistons are fitted with oversize rings. Oftentimes the lathes are operated with as many as four different cutters in use at once.

The seven foot lathes have a 16-inch swing and eight foot lathes have 14-inches. Cutting tools of appropriate hardness are used on the lathes to correspond with the various types of metals being machined.

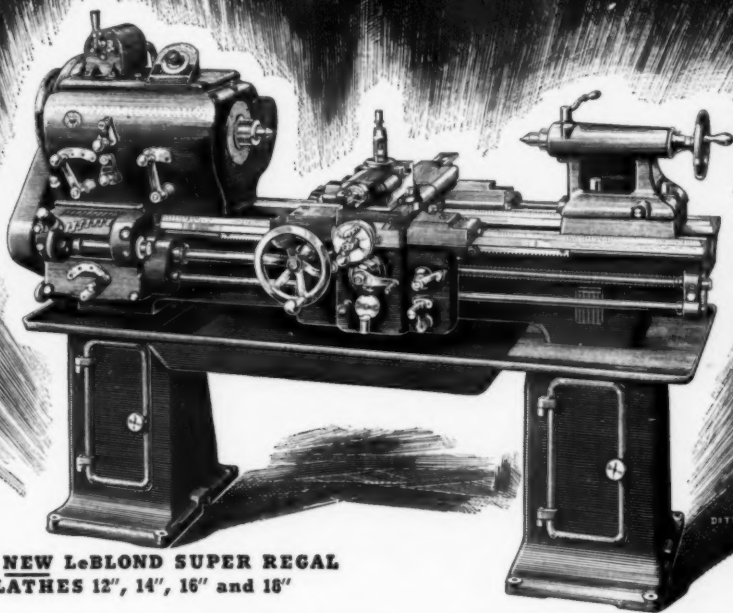
There are dozens of other smaller and larger machines for testing parts and working metal. A small Delta drill handles sensitive work. Other high calibre tools play equally impor-

tant roles in the rejuvenating and maintenance of the airplane motors. And, despite the care and precision with which all operations were handled, the engines are not permitted to return to the air until they have undergone the most exacting and rigorous tests.

For around 4½ hours the motors are run in simulation of actual flying conditions. Attached to various parts of the motor are wires and tubes that transmit complete performance indications to recorders on a central control panel. Testers watch the panel carefully for any evidence of faulty operation. Complete records are made of these tests. It is only after the power plants have stood up perfectly for a continuous 4½ hours that they

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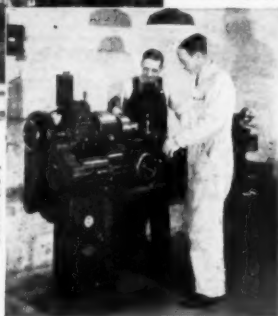


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New—redesigned—vastly improved—heavier construction throughout—increased swing—sturdier bed with exceptionally heavy ways. Furnished with either plain or anti-friction bearings . . . Speed selector now built into headstock with dial to show cutting speed for commonly machined materials—to indicate R. P. M. for proper cutting speed—to show lever setting to deliver indicated speed . . . These new features plus Regal's well known safety, accuracy, simplicity and performance, will be welcome news to Regal enthusiasts.

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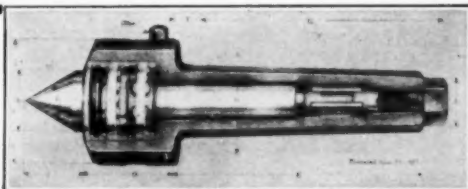
are permitted to leave the base.

The complete overhauling of a plane takes around five weeks. This includes removal and readjustment of everything from the wings to the upholstery of the planes. It is only in this manner that the airlines can maintain their excellent records of safety in the air,

and control of the operations of their planes.

American Airlines is said to be the largest line in the country. Its Chicago hangars will accommodate 10 of the huge 14 to 28 passenger planes. But it's seldom that more than three or four planes roost in the hangar at once.

Here is a tool especially adapted for unusually heavy work. It is equipped with a combination of precision type roller and ball bearings to assure the rigidity and maximum capacity for high speed production and longest possible service.



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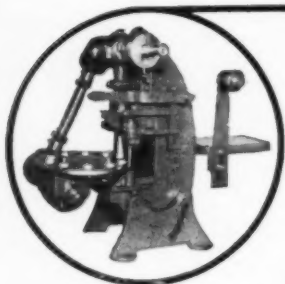
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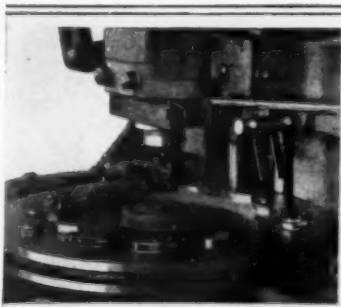
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Production rate depends entirely on the type of work being done, varying from 2000 to 4000 parts per hour with hand loading. With automatic loading and ejector mechanism, production may be increased to 9,000 or 10,000 pieces per hour.

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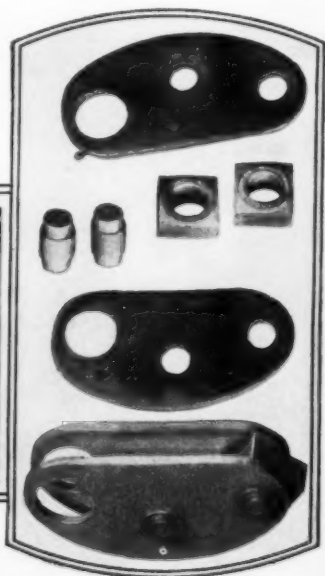
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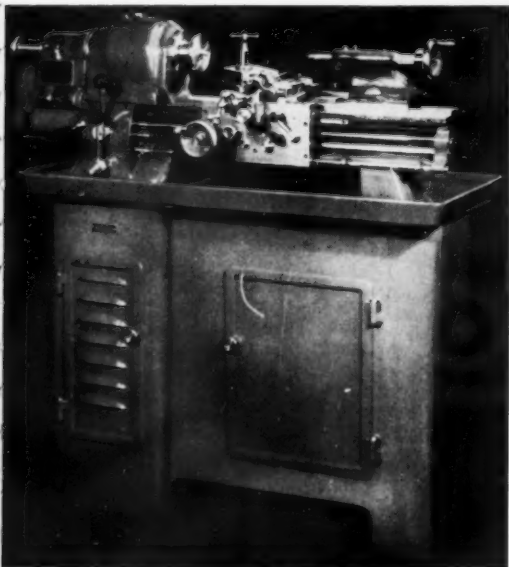


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The Hardinge Precision High Speed Tool Room Lathe

Hardinge Brothers, Inc., Elmira, N. Y., are now offering a precision tool room lathe, designed to combine accuracy, convenience, and speed with the power and studiness found in an engine lathe.

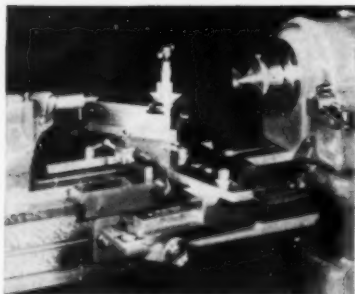
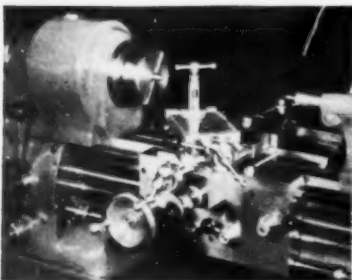
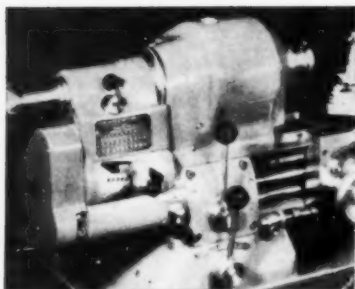


The lathe was developed out of the familiar Hardinge Quick Change Screw Cutting Lathe, whose size suggested that it was more nearly an engine lathe than a tool room lathe. The Hardinge lathe is therefore said to be built upon experience with the previous design under actual operating conditions.

The bed of the new lathe features a mounting on three balls to prevent distortion of the bed in installation or use. After being cast, it is rough machined, seasoned to relieve internal stresses, finish machined, and finally scraped to master gauges. This type of bed is said to eliminate chatter, give a smooth finish to the work, and eliminate binding of the carriage under heavy cuts.

In the headstock, pre-loaded ball bearings are used, eliminating both end and radial play of the spindle and permitting a speed range of from 170 to 1750 r.p.m. With the back gears, which reduce the spindle speed $6\frac{1}{4}$ times, the low speed of 27 r.p.m. is attainable. The spindle has an inside bore of $1\frac{1}{4}$ inch and a collet capacity of 1 inch.

The carriage of the Hardinge lathe is large



The top picture shows the headstock arrangement of the new Hardinge lathe, with the convenient controls. Also shown is the gear box plate. In the center is illustrated the carriage and apron assembly. The lower picture shows the lathe's taper turning attachment, viewed from the rear of the lathe.

without being clumsy. It is said to be sufficiently rigid to withstand heavy cuts without chattering. For screw cutting, the customary thread chasing dial has been eliminated by allowing the lead screw to stay engaged at all times. This permits the operator to cut threads as fast as he cares to without the possibility of plugging the wrong hole in the chasing dial and ruining his previous work.

The tailstock is designed to give full bearing to the tailstock spindle, regardless of position. The spindle is graduated in eighths of an inch and the handwheel in thousandths.

The accompanying illustration, showing the front of the lathe, also gives a good view of the welded steel pedestal. This pedestal completely encloses the motor, controls, and driving unit and provides space for storing tools, chucks, collets, and other attachments. The complete lathe unit requires floor space of 26 by 52 inches. It is seen that foot space is provided under the pedestal for the operator, and that there are louvres in the drive end for ventilation. To facilitate moving, openings are provided at the floor at each end of the pedestal. The machine can be bolted to the floor inside the pedestal base, eliminating brackets on the outside. The pedestal is designed to harmonize in appearance with the lathe's modern features of design and construction.

The lathe has a 9-inch swing over the bed, with 15 $\frac{1}{4}$ inches between centers. The standard swing makes possible the use of many standard Hardinge bench lathe attachments. The control equipment furnished with the lathe is easily handled, the controls being readily accessible.

Under the general specifications of the machine, standard equipment includes headstock, carriage, tailstock, taper turning attachment, quick change gear box, set of eight change gears, pedestal, and driving unit. Completely assembled, this equipment weighs about 1000 pounds.

The gears and gear box have been designed to furnish 30 different threads, ranging from 11 to 136 pitch, as called for in the National Screw Thread tables.

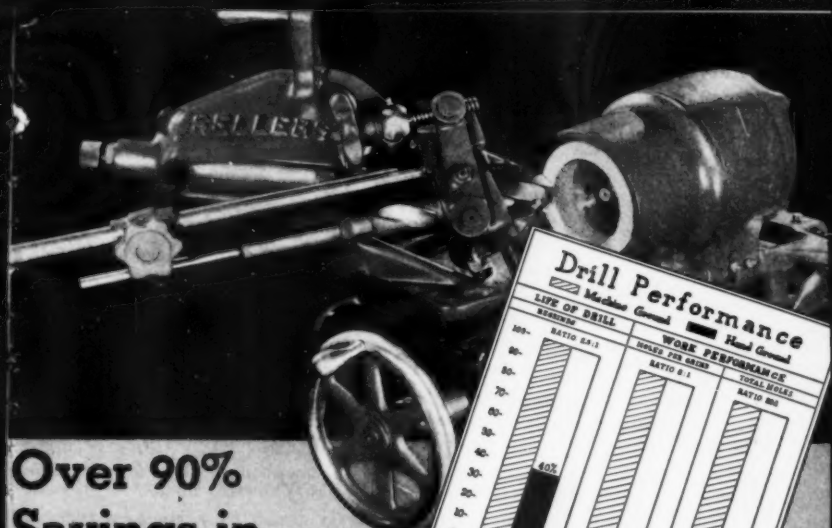
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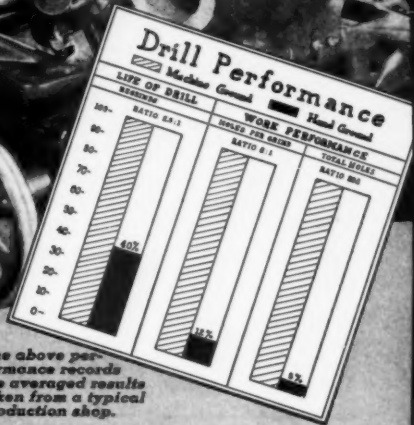
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Over 90% Savings in Drilling Costs!



The above performance records are averaged results taken from a typical production shop.



Sellers Model 05—D Drill Grinder for 2-flip twist drills 1/16" to 1/2" diam.

RECORDS of performance show that drill grinding on a Sellers grinder more than doubles drill life, increases the number of holes per grind as much as eight times, and saves over 90% in drilling costs.

This outstanding performance is the result of accurate, uniform grinding. Twist drills, whether in dozen or thousand lots, can be ground identically with correct, duplicate lips, proper clearance and equal lengths.

Simple, fast, accurate -- a Sellers' Drill Grinder saves enough within a few months to pay for its cost. Write for illustrative bulletin.



Sellers Model 20—D Drill Grinder for 2-flip twist drills up to 3", and 3 and 4-flip twist drills up to 2 9/16" diam.

William Sellers & Co.

600 Hamilton St INCORPORATED Phila. Pa.



Sellers

These pitches include: A full range of standard threads from No. 0 — 80 to $1\frac{1}{2}$ " — 12, National Fine; No. 1 — 64 to $\frac{5}{8}$ " — 11, National Coarse; $\frac{1}{4}$ " — 27 to 2" — $11\frac{1}{2}$, American Briggs; $\frac{3}{8}$ " — 48 to $1\frac{1}{8}$ " — 11, Whitworth; and $\frac{1}{4}$ " — 32 to $2\frac{1}{4}$ " — 16, National Extra Fine. By the use of change gears, the machine may be adapted to cut threads as fine as 250 pitch, including the Waltham and Elgin National Watch Standard threads. A translating set of gears for converting the screw attachment to the metric system is also available. In thread cutting, the manufacturers claim several advantages of design and construction for their new lathe. It is asserted that the simplicity and extreme accuracy of the machine make possible precise thread cutting by only moderately skilled operators.

In appearance, the lathe is exceptionally clean-cut and simple. It is beautifully finished and gives an impression of precision and ruggedness.

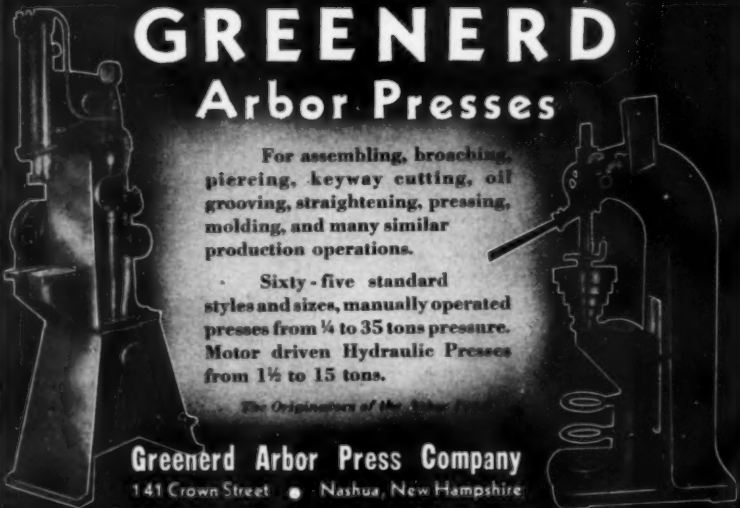
It should be a worthy addition to any tool room or precision manufacturing plant.

B. & S. No. 0 Milling Machine

A new milling machine, designed to meet the need of shops where medium-light cuts are required, is now being offered by Brown & Sharpe Mfg. Co., Providence, R. I. The manufacturers feel that it will find wide use in job-lot or small-quantity production, small parts manufacture, and in vocational schools and colleges.

The machine is similar to the company's No. OY Plain Milling Machine, but it does not have the semi-automatic table found on that model.

It is driven by a constant speed 1 h.p. motor mounted underneath a guard on the side of the column. It can also be supplied with an overhead counter-shaft drive. Eight changes of spindle



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For assembling, broaching, piercing, keyway cutting, oil grooving, straightening, pressing, molding, and many similar production operations.

Sixty-five standard styles and sizes, manually operated presses from $\frac{1}{4}$ to 35 tons pressure. Motor driven Hydraulic Presses from $1\frac{1}{2}$ to 15 tons.

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AT DOEHLER DIE CASTING CO., POTTSTOWN, PA.

Usual Time, formerly drilled and milled,

	80 hours
DoAll Contour Saving - - - - -	26 "
Sawing - - - - -	54 "

Plus saving end mills, drills and machine released for other jobs.



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Contour Sawing is a new process of machining which eliminates drilling a row of holes, to cut out any internal or external shape. The DoAll cuts any metal or material (up to 10" thick) rapidly and smoothly. The narrow saws are inexpensive.

The Modernizing Machine Tool



The DoAll does the same class of work as a shaper, milling machine and tool room lathe. DoAll is a rugged precision tool that sells for $\frac{1}{2}$ the price of any one of the machines mentioned above, and replaces them all. Users say it is the busiest machine in the shop.

DoAlls are used in quantities in large and small plants in 23 countries, and by such well known firms as Ford, Fisher Body, Cadillac, Baldwin Locomotive, Douglas Aircraft, U. S. Navy, International Harvester, General Electric, Westinghouse, Ace Tool & Die, Glenn L. Martin, etc.

Let a factory-trained man bring a DoAll to your plant and show you what it does, what it saves on your own work.

H-2

☐ Send data and special prices on the DoAll.

☐ Send Free Hand Book.

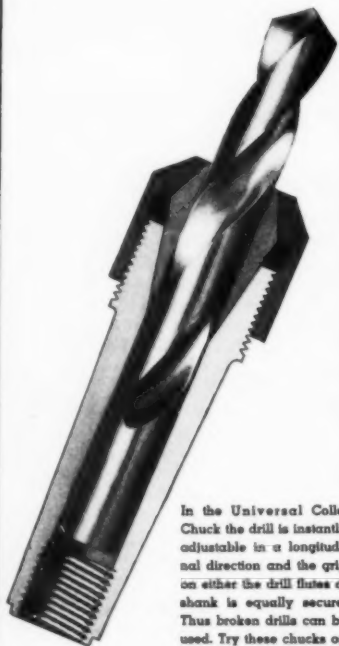
FREE—New Hand Book on Contour Machining — 100 pages of valuable metal working helps.

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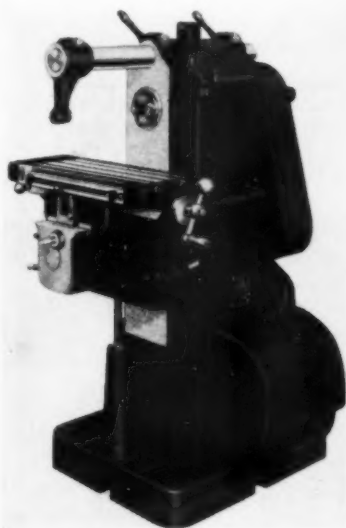
Universal **COLLET CHUCK** For Single-Purpose Drilling



In the Universal Collet Chuck the drill is instantly adjustable in a longitudinal direction and the grip on either the drill flutes or shank is equally secure. Thus broken drills can be used. Try these chucks on your drill press or screw machine.

UNIVERSAL
Engineering Company
Frankenmuth, Mich.

speed are available, from 120 to 1350 r.p.m. On the motor driven machine, speed changes are obtained through 4-step cone pulleys and change gears; with the overhead drive a 2-speed overhead countershaft is used with 4-step cone pulleys. 64 rates of feed, eight for each spindle speed, from $\frac{5}{8}$ " to $79\frac{5}{8}$ "



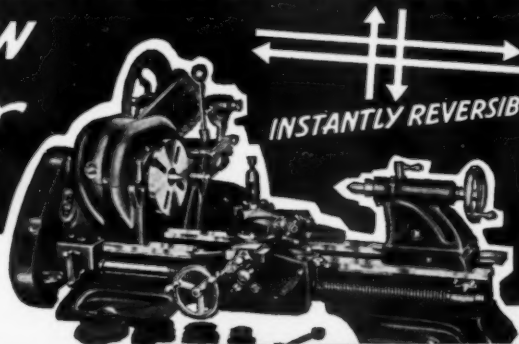
per minute, are also available. The spindle, with a hole diameter of $\frac{3}{8}$ inches, is designed to receive standard arbors. It is mounted on three adjustable anti-friction bearings. The arbor yoke has an adjustable phosphor bronze bushing with a $\frac{3}{8}$ -inch hole. The working surface of the table is $22\frac{1}{2}$ by $8\frac{1}{2}$ inches.

The new plain milling machine is equipped with all the B. & S. refinements. For further information, please write to the manufacturers, mentioning The BLUE BOOK.

POWER FEEDS 4 WAYS

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Atlas



INSTANTLY REVERSIBLE

POWER CROSS FEED Standard Equipment *Plus All Other* Modern Features

Now everything you've wanted in a bench lathe for tool room or shop has been provided in the new Atlas 10^F Series Lathes. Here—for the first time—is a low cost precision lathe with instantly reversible automatic power cross feed and longitudinal feed as standard equipment.

Here, too, is a lathe that gives you all these modern features at no extra cost. Complete V-belt drive, quick-change counter-shafts, compact controls, precision-ground bed ways, custom-built spindle bearings, back-gearing power, and many others.

Two styles of countershafts are available—the horizontal countershaft type, complete as shown less motor, at \$104.75, and the vertical countershaft model at \$99.75. Ask your dealer to show them to you.



An Atlas assembly line—one of the many examples of modern production methods that enable Atlas to give you more for your money in shop equipment.

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1939 Catalog of Atlas Shop equipment contains many outstanding machine tool values—metal lathes, drill presses, shapers, arbor presses, motors and grinders.

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Progressive Announces New Punching Development

A new development in punching and stripping equipment, said to involve a new principle for such equipment based on the combination of hydraulic pressure with balanced spring action, is announced by Progressive Welder Co., Detroit, Mich.

Designed for use either individually or in groups (for multiple punching), the new punching and stripping units are simple in design, construction and operation. One type is for single punch operation and another type for multiple punches. For pressures up to 2000 lbs. per square inch both types may be operated either by motor driven pump or air-hydraulic booster. For higher pressures the boosters are used.

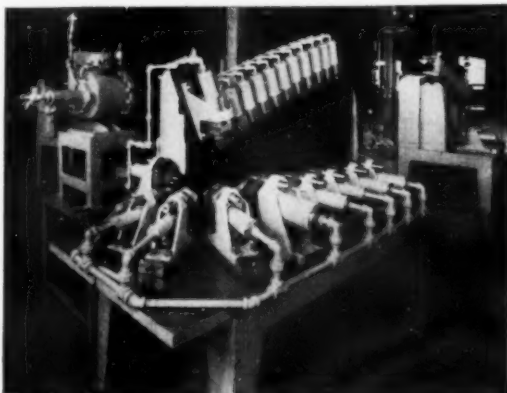
It is explained that the design of the multiple unit permits the use of a single acting piston eliminating packing glands, permitting a greater bearing surface for the piston and rod, and requiring half the amount of piping which would otherwise be necessary. Close adjustment of the entire unit in relation to the work is provided at the mounting bracket.

In the single punch unit, stripping is performed through the action of balanced springs, the operation being completely automatic. The multiple punch unit shown is available for either hydraulic or mechanical stripping.

Operation of the smaller unit with Progressive Booster is as follows:—Air at ordinary pressure on the oil in the booster moves both punch and stripping shoulder up to the work, at which point the resulting back pressure

trips a switch admitting the air to act on the pressure booster cylinder creating the necessary high pressure to drive the punch through the work.

When pressure at pressure chamber (1) is relieved, the punch is withdrawn by the action of the stripping spring—shown coiled around the punch which is the stronger of the two springs used. This spring acts against both the punch retainer (4) and the piston guide (shaded), the latter being firmly held



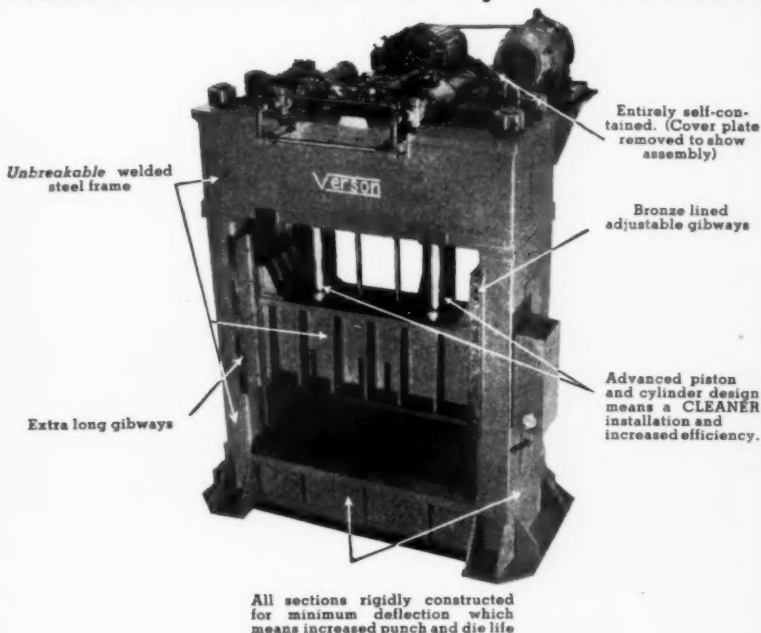
in place until stripping is completed. When compression on the stripping spring approximates that of the piston spring, the latter moves the piston guide away from the work and to the starting position.

Adjustment of the retaining plate (5) which can be moved through an arc of 25 degrees, positions any slotted or irregular faced punches. A neoprene cup seals the pressure chamber against oil leaks. Length of stroke is limited by the steel sleeve (6). A floating piston rod (3) is provided between piston and punch.

Operation of the larger unit—as equipped for mechanical stripping—is similar in principle to that of the smaller unit except that two stripping springs, contained in separate ground hollow guide pins, are used for the stripping. When the stripping pistons

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ALLSTEEL HYDRAULIC *Speed* PRESSES



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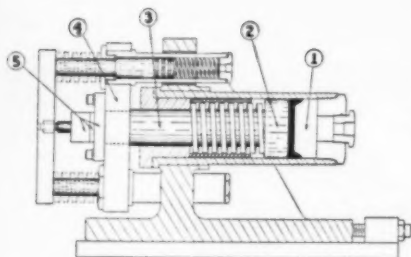
They are available in a full range of sizes in GAP TYPE—STRAIGHT SIDE—ONE AND TWO POINT—SINGLE AND DOUBLE ACTION.

Other Verson PRODUCTS are: SINGLE—DOUBLE—and TRIPLE ACTION MECHANICAL PRESSES up to 5000-tons capacity; PNEUMATIC DIE CUSHIONS; PNEUMATIC CLUTCHES; PNEUMATIC COUNTERBALANCING CYLINDERS; and PRESS BRAKES in capacities up to 30"x5/8".

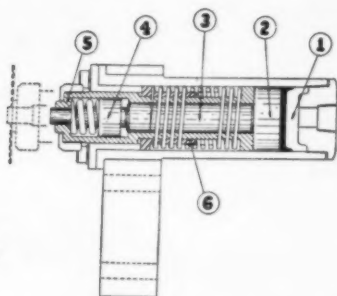
VERSON ALLSTEEL PRESS CO.

9303 SO. KENWOOD AVE.,

CHICAGO, ILLINOIS



finally bottom in their cylinders, the continuing retraction of the main piston moves the stripping plate away from the work. Stroke is also limited by steel sleeve (6). It should be noted, for clearer understanding of the operation, that the piston (2), rod (3), punch retainer (5) and hollow stripping guide pins are integral so far as operation is concerned, the stripping guide pins being carried in large bronze bushings affording close alignment of punch.



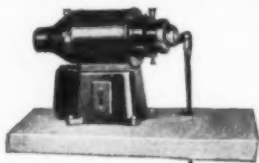
Reference to the sketch shows the adjusting screw provided for correct positioning of the entire unit and also the manner in which additional stripping springs (dotted) may be used for greater stripping power.

When hydraulic stripping is employed, a motor driven pump is the usual power source. Pressure is then diverted from chamber (1) to the stripping guide pins. An oil resisting cup seals the stripping chambers, although piston rings are optional. Rings are also optional for the punch piston.

An example of the use of hydraulic punching with mechanical stripping is shown at the beginning of this article. This installation for an automobile plant consists of 20 of the mechanical stripping units mounted in a fixture to punch a total of 36 holes in one half of a hood top. Four such fixtures are used for left and right hand hood top halves for both a 6 and 8 cylinder car.

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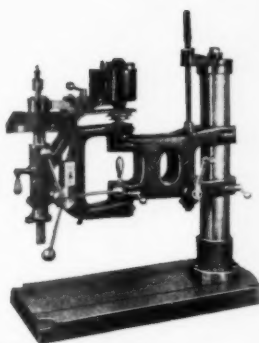
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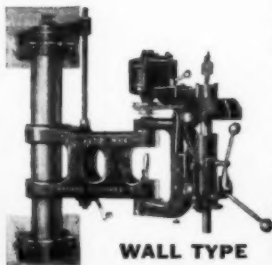
Ball bearing equipped throughout . . . a long extension spring within the drill frame provides sensitive balance of spindle at all speeds. Depth gauge and graduated spring are furnished.

Drill capacity, $\frac{1}{2}$ " ; minimum distance, spindle to column is 6" ; maximum distance is $31\frac{1}{2}$ " ; minimum distance, spindle nose to base is 4" ; maximum distance, 21" ; spindle travel 5" ; spindle bore, Morse No. 2 ; high grade $\frac{1}{2}$ " chuck furnished with Morse Taper.

Available in Bench or Wall Types. Spindle can be provided with taper, or motor equipped with reverse switch. Motor bracket is located for larger or different makes of motors.

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WALL TYPE

F. H. AYER MFG. CO.,
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Littell Feeding and Straightening Machine

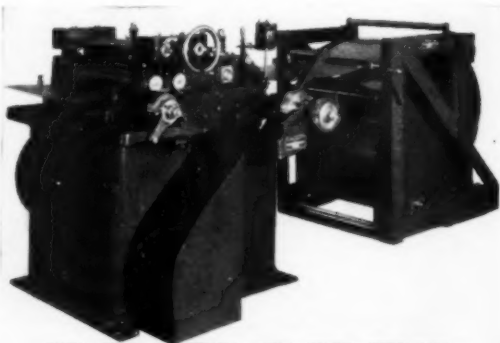
The F. J. Littell Machine Co., 4153 Ravenswood Ave., Chicago, Ill., announces a new feeding and straightening machine that should find wide use in plants operating heavy presses.

The unit is self-contained and capable of remote-control operation. The manufacturers state that it is particularly adapted for use with toggle-drawing and double-action presses.

In the operation of the machine, stock is fed into two 5½-inch pinch rolls and then through a five-roll straightener. On the standard unit, the length of feed can be as high as 25 inches. ⅛-inch stock, 25 inches wide,

can be handled. Heavier stock can be handled in smaller widths. The machine is equipped with a 2 h.p. motor for driving the rolls and a 1 h.p. motor on the feed reel.

In writing the manufacturer for additional information we will appreciate mention of The BLUE BOOK.



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NEW Series H Productimeters, cleaned in their wrinkle finish, dust-proof cases, combine modern design with all the features tried and proved over sixty years of building counters for industry. Stroke and Rotary models in 20 variations.

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This precision-built Press has more die space, and easier adjustment. It is of heavier construction and has improved ball and socket connection. Convertible clutch for single stroke or continuous operation.

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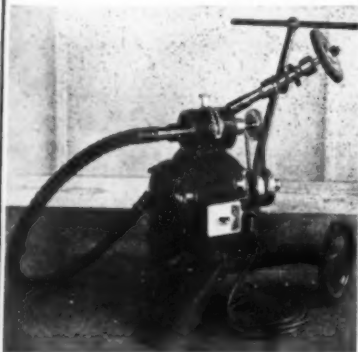
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JARVIS

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A large variety of Jarvis Flexible Shaft Machines, either single or multiple speed, are available for rotary filing, grinding, polishing, buffing, sanding and many other operations. A great number of Jarvis Ground from the Solid Rotary Files and other rotary tools for innumerable operations may be selected from our new catalog "MST."

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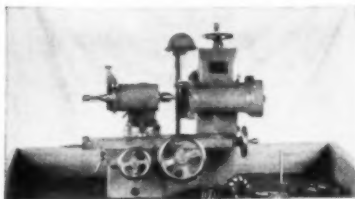


Chas. L. Jarvis Co.
MIDDLETOWN • CONN.

Two Bergram Grinders

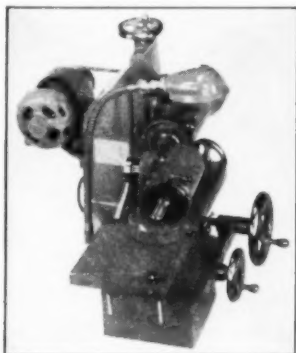
The Bergram Mechanical Engineering Co., New Britain, Conn., offers a precision built, wide range utility grinder with many interesting and useful features. Also a new production surface grinder.

The utility grinder is powered by a $\frac{1}{4}$ h.p., 3600 r.p.m., 110 volt, 60 cycles, single phase ball bearing motor. The welded steel column and base are a single unit, with stress relieved after welding to give freedom from distortion or misalignment.



The grinding wheel unit is mounted on the face of the column. It is provided vertical adjustment and a dovetail slide by means of a handwheel. A scale plate indicates the proper wheel position for any desired clearance angle. To allow grinding to a sharp edge and to provide the correct clearance angle the wheel spindle head may be swiveled. It is mounted on permanently lubricated ball bearings and is driven by a flat belt. The motor, mounted on the rear of the column, is adjustable to control the tension of

the belt. This is said to prevent any contribution to spindle vibration. The spindle is made in generous proportions for durability and high accuracy.



The swivel bracket holding the work head may be tilted vertically or swivelled horizontally. A swing latch, permitting rapid release and return, holds the work head bracket in the zero position. Like the spindle head, the work head is mounted on permanently lubricated ball bearings. An indexing dial and clamp facilitate setting up the cutter and keep the cutter in position while the work is being ground. The work is moved across the wheel by a rack and pinion pair or by a hand wheel.

The saddle on which the table is mounted slides on dovetail ways on the base of the machine. The ways provide either cross-feed or in-and-out-feed of the work to the grinding wheel. Movement and setting of the saddle are controlled by a hand wheel and graduated dial.

The machine has a vertical adjustment of 5 inches; longitudinal travel of 6 inches by rack and pinion feed, 2 inches by screw feed. The cross travel of the machine is $1\frac{3}{4}$ inches. The work head may be tilted 20 degrees either way from zero. The wheel spindle revolves at 5200 r.p.m. With the bench, the machine is $43\frac{1}{2}$ inches wide, 43 inches deep, and 55 inches in

JARVIS

FLEXIBLE SHAFTING

With many years of experience as manufacturers of flexible shafts and with a great variety of either standard or special flexible shafts to choose from, we are prepared to meet your requirements.

Jarvis flexible shafts may be purchased either cut to length or in mill lengths, for new installations or replacements.

Jarvis flexible shafts are self-contained and can be cut at any point without unraveling.

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Chas. L. Jarvis Co.
MIDDLETOWN • CONN.

total height. All adjustments for setting the machine up are made by knurled clamp screws and buttons, eliminating the use of wrenches.

For complete information, please address the manufacturers—and we'll appreciate mention of The BLUE BOOK.

Short Cuts in Shipping

Thousands of dollars are lost annually in shipping rooms because of antiquated methods of packing. Today packing has become a science. Methods have been evolved that provide more efficiently and economically for the shipping of odd-size machinery and small parts.

The Ames Bag Machine Co. is one of the pioneers in the manufacture of cotton bags for packing and shipping odd-size machine parts and small articles. The results of their long experience in this field are condensed in a folder, "Short Cuts in Shipping", now ready for circulation. This informa-

tional folder should be invaluable to the shipping manager and purchasing agent.

The condition in which a product is received makes a definite impression on the customer. If screws or other miscellaneous parts are missing, there is the added cost of replacements and also the danger of losing a valuable account.

Since the designing of a product is often determined by factors in packing, industrial designers will also find the Ames Bag Folders of great value.

The information found in the Ames Bag Folders will assist in reducing shipping costs during this coming year. Copies will be mailed to readers of this magazine without charge. Upon receiving your request for the first folder, your name will automatically go on the mailing list for subsequent folders in this series. Just send a card with your name and address to Ames Bag Machine Co., care Hitchcock Publishing Co., 508 S. Dearborn St., Chicago, Ill.



MAGNETIC CHUCK USERS— NEU-TROL ELIMINATES

With NEU-TROL no extra operations are necessary with a babbitt hammer or crowbar . . . in removing work from a magnetic chuck. NEU-TROL saves time . . . prevents damaging, scoring and marring of the work and magnetic chuck and avoids bruised knuckles . . . by releasing the work completely and demagnetizing it.

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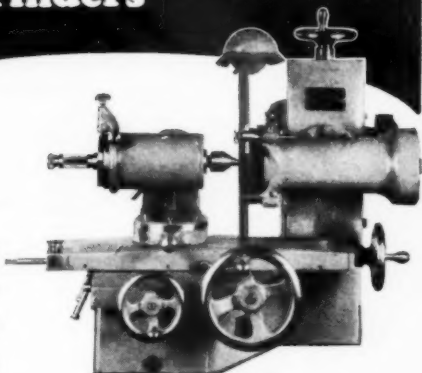


Two New Grinders

By
BERGRAM

Presenting—

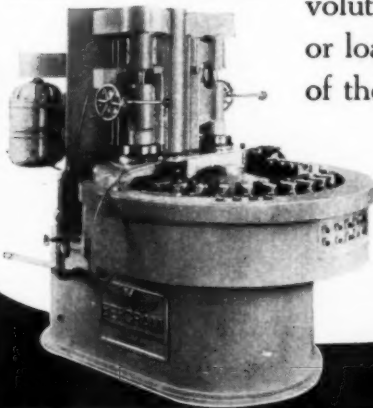
Bergram's New Utility Grinder, a precision built, wide range unit that will maintain its accuracy over a long period. It has all the requisite adjustments—and it is a time- and money-saver in any shop.



Utility Grinder

Bergram's New Type SG-1 Production Surface Grinder with work-holding fixtures that close during the grinding portion of one revolution, and open for ejecting or loading during the remainder of the revolution.

Production Surface Grinder



*Size, flatness and finish
automatically controlled
to precision limits.*

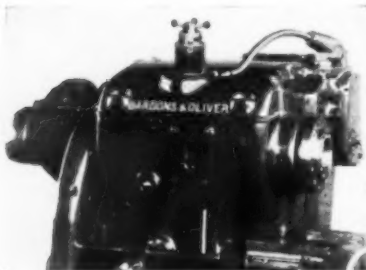
*Write TODAY for
complete information
on these new units.*

NEW BRITAIN, CONN.

**BERGRAM
MECHANICAL
ENGINEERING CO.**

B. & O. Hydraulic Speed Preselector

The demands of modern manufacturing for higher efficiency in the operation of machine tools have been considered in the design of the new single-lever speed preselector now available on Bardons & Oliver No. 5 and No. 7 universal turret lathes. By this device, spindle speeds may be preselected at any time and then shifted at the desired time with the single control lever.



The manufacturers claim that the preselector enables the operator to change spindle speeds without removing his eyes from his work. In the operation of the speed selector, the natural clutch-releasing movements have been retained. However, as the lever is moved from the forward to the neutral or brake position, it passes a point at which it may be slightly depressed. At this point the clutch has been disengaged and the

gears are coasting. Depressing the lever at this point opens the valve to a hydraulic system, allowing the oil to flow into certain cylinders. The oil moves the gears, as preselected on the selector dial, into the proper positions to give the spindle speed selected.

In the actual operation of the machine this means that the operator, while running his machine at one spindle speed, can select the spindle speed for the next operation. Then, as the time for that operation arrives, the movement of the clutch lever actuates the hydraulic mechanism that shifts the gears. The operation of the mechanism is similar to that of the hydraulic gear shifts in the new automobiles — while riding at high speed, the driver may select second speeds at his leisure and then quickly shift the gears by depressing the clutch pedal.

The selector dial is provided with a cylinder, shown in the illustration, which automatically transposes the spindle speeds into surface feet per minute for various sizes of stock. With the advance of tool design, definite cutting speeds, depending on the tool, the kind of stock, and the depth of the cut, are available. The selector eliminates guesswork on the part of the operator by giving him, in direct reading, the surface speed of his work at his registered spindle speed.

BLUE BOOK readers may receive complete information concerning this development. Write to Bardons & Oliver, Inc., Cleveland, Ohio.



POWER DRIVEN FORGE HAMMERS

Formerly the Mayer-Moloch Hammer—made in 5 sizes, belt or direct motor drive—25 lb. to 500 lb. ram—extremely powerful, simple design. Write for details and prices on hammers or any repair parts.

D. J. MURRAY MFG. CO.
Wausau, Wis.

Established 1883

HERE'S A REAL DRILL VISE



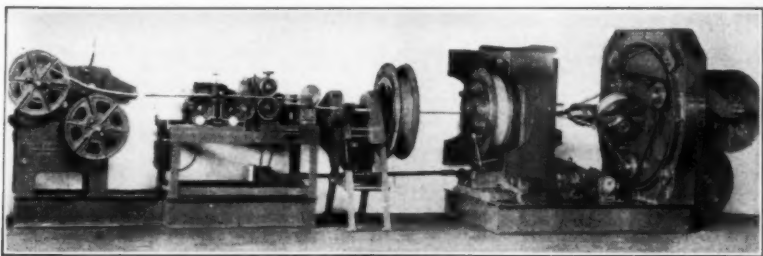
Shut-Grip Jaws 5-in. wide, hardened, reversible; open 5-in. Hold round, square and odd shapes—usable three ways. Satisfaction guaranteed—price, only **\$12.50.**

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JOHNSON TOOL CO., INC.

65 Massasoit Ave.,

East Providence, R. I.



Combination Cable Armoring Machine

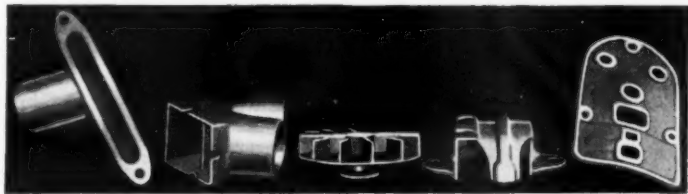
A new cable armoring machine, designed by Sleeper & Hartley, Inc., Worcester, Mass., is a combination of five separate units which function as follows:

The strander, or take-off, consists of a rotating head, carrying two or three trunions upon each of which is suspended a 30" spool of insulated conductor wire. The head rotates, twisting

the several wires together, but the spools stay in a normally horizontal plane. A friction device provides control of wire tension.

As the twisted wires proceed through the head, they enter a wrapping device. Here the twisted wires are wrapped with a continuous paper strip. The paper-wrapped twisted wires then pass to and through the armoring head which coils around them a galvanized steel strip. The strip stock is supplied from a split spool which, when empty,

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KUTMORE Adjustable Hollow Mills



The finest tools of their kind. Highest in quality and performance, yet lowest in price. Write for new catalog.

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839 LAKE AVE., ROCHESTER, N. Y.

may be removed from the head, over the finished cable, without necessity of cutting.

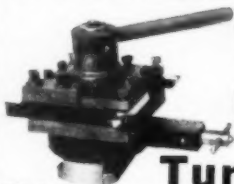
The spooler, the next unit in line, has a hollow spool spindle with rotating head and quick-release jaws. It is equipped with a double-screw traverse mechanism which properly lays the desired width of strip stock. Full spools are shifted from the spooler to the armoring head by means of chain-fall on overhead rail.

The finished cable then reaches the measuring and cut-off unit consisting of flexing rolls (horizontal and vertical) and a drawout capstan which keeps the cable taut, from the armoring head through the hollow spindle of the spooler and around both flexing rolls. The measuring wheel is so arranged that the finished cable rides over the surface causing movement of a trip cam connected to the cutting device. It is arranged with change gears for cuts of 100, 150, 200, 250 foot lengths. The cutting-saw operates automatically while the cable armoring machine is in operation.

The take-up, a 2-spindle unit, is equipped with 20"x6"x10" barrel collapsible spools with removable front flanges. Each spindle is equipped with an individual clutch for independent operation. A friction device assures constant speed of the take-up. A cam-operated traverse device with change gears is provided to cover complete range of cable diameters.

The machine is approximately 24 feet long.

COLWELL



Tool Post Turrets

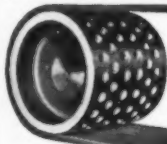
18" Lathe Size

save time and labor . . . increase production and profits. Available in sizes for lathes from 9 to 18-inches . . . also for turret lathes . . . and a new "Midget" size for small lathes, Cataract, etc. Four positions . . . fast . . . simple . . . accurate . . . dependable.

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**Shut Off Expense Caused by Slippage
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GUARANTEED to: Eliminate belt slippage and power loss because the belt is sealed to pulley at vacuum contacts . . . increase life of belts and equipment . . . enable machines to take larger cuts and operate at maximum capacity . . . wear indefinitely . . . keep belts from flying off . . . Sizes from 2" up to 72" . . . recommended for short center drives . . . Try one at our risk on your worst drive.

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"Foundry Work"

To keep pace with the rapid strides made by the foundry in recent years, the practical handbook, "Foundry Work," by William C. Stimson and Burton L. Gray, has been revised by John Grennan, of the University of Michigan.

In no other branch of industry is so much dependence placed upon "shop kinks" as in foundry work. Casting is an art—and science—that has de-

veloped with the needs of civilization since the earliest times of history, but in no other period of history has foundry work made such advances as in the past few years.

The authors are men of wide experience in both practical foundry work and the teaching of foundry practice. The book, then, is not only written with the voice of authority but is also interesting and instructive.

Included in the book are sections on molding practice, equipment, and processes, molding problems, die casting, molding machines, melting equipment, fuels, metallurgy of cast metals, and core making. No process in the making of castings has been overlooked.

The book, containing 216 pages, is well illustrated with 148 photographs and drawings. It is printed in readable type. A dirt- and moisture-resisting cover has been provided to permit the use of the book around the shop.

Foundry men of experience as well as others interested in foundry practice will find this book invaluable.

"Foundry Work," priced at \$2.00, may be obtained from the publishers, The American Technical Society, Drexel Avenue at 58th Street, Chicago, Ill.

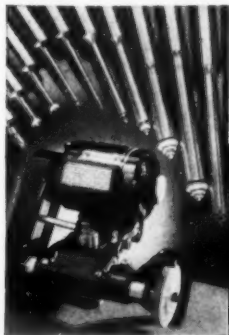
Only DUMORE Gives You ALL OF THESE

- Lightweight for easy portability.
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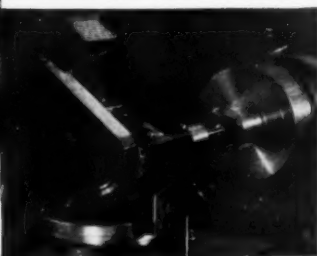
When you get a Dumore, you get more than one or two special features. For 25 years Dumore engineers have painstakingly developed and improved each part as if it were the most important in the entire grinder assembly. That's why Dumores maintain a precision of .0001" long after ordinary grinders have reached retirement.

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No. 5 "Master" Grinder with its 12 quills. At right this versatile tool is in action.



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A dependable, precision tool that will soon pay for itself.

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9", 11", 13", 15" AND 16" SWING

3' TO 12' BED LENGTHS

PRICED \$85 TO \$1500

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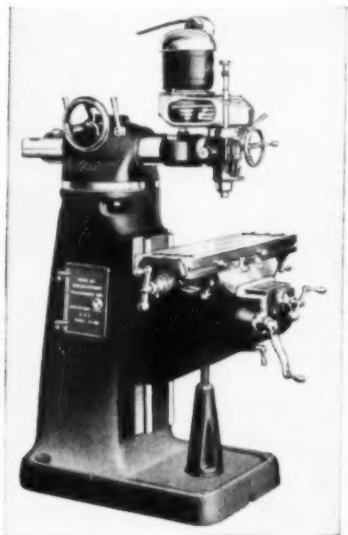
SOUTH BEND LATHE WORKS

879 E. Madison St.,

South Bend, Ind., U. S. A.

New Turret Milling Machine by Bridgeport

Bridgeport Machines, Inc. (formerly the Bridgeport Pattern & Model Works) has recently put on the market a new turret milling machine. The outstanding feature of the new ma-



chine, according to the manufacturers, is its extreme flexibility. It has the wide range of 20 inches in longitudinal feed, nine inches in cross feed, and 16 inches in vertical feed of knee.



GEARS IN STOCK— IMMEDIATE DELIVERY

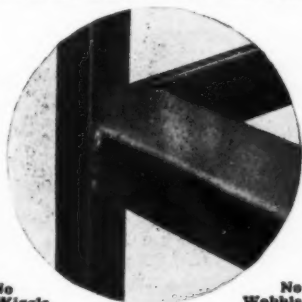
Gears, speed reducers, sprockets, thrust bearings, flexible couplings, pulleys, etc. A complete line is carried in our Chicago stock. Can also quote on gears of any kind. Send us your blue prints and inquiries.

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CHICAGO GEAR WORKS,

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by equipping with
"HALLOWELL"
Full-Welded
STEEL STOOLS**

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When you buy "Hallowell" Stools and Chairs you're sure of getting the maximum value for every cent you spend, for they have the all welded construction that makes them practically one piece. There's no weak riveted joints to loosen up... no chance for them to get rickety and wobbly after a little service. No indeed, "Hallowell" Stools stay firm and rigid. Obviously, that cuts down replacement costs and at the same time provides more comfortable, more efficient seating for your employees.

"Hallowell" Stools and Chairs are made in a complete range of styles to fill every industrial seating requirement. Get our catalog that describes and illustrates them.

Fig. 1249
Patent Applied for

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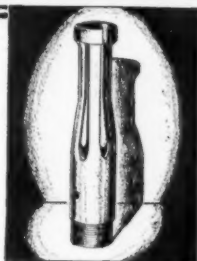
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St. Louis
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Trap*

or

Squirrel Cage"



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STILL THE WORLD-FAMOUS
MODERN PUSHERS

- Have you ever heard of the "fly-trap" or the "squirrel cage" pusher? Or is it known in your locality as a "gas pipe" pusher, or given the name of a movie star noted for her voluptuous curves? Any of these unique designations—and there are more—refer to the best-known and most widely-used pusher manufactured today—the standard Modern Pusher.

This fully patented pusher is unequalled for feeding action, easy adjustment and durability. Any Modern Pusher will handle either round and hex or round and square stock—reducing tool inventory. Be sure you're fully acquainted with all of its unusual features—and with every other Modern Product.

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AND MACHINE CO.**

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SOCKET HEAD
CAP SCREWS



SAFETY HOLLOW
SET SCREWS

**MADE OF ALLOY STEEL
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AMES BENCH LATHES



Precision lathes for doing most accurate turning, drilling, milling, threading, filing, polishing, in the tool room or in production.

Send for Complete Information

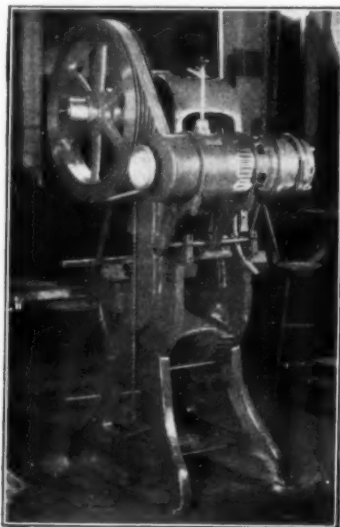
**B. C. AMES COMPANY
WALTHAM, MASS.**

The machine is equipped with a $\frac{1}{2}$ h.p. heavy-duty motor. It weighs about 1500 pounds and is of convenient size for hand operation. The overarm is keyed and equipped with a worm wheel control for angular setting. The overarm is five inches in diameter, extending at the rear of the machine for providing a slotting attachment. $\frac{3}{4}$ -inch graduated dials control the adjustable parts.

Tool and die departments as well as production departments, should find wide use for this new unit. For further information, address Bridgeport Machines, Inc., 52 Remer St., Bridgeport, Conn.

Schultes Drive Applied to Presses

Something new in the application of multiple-speed gear drives has recently been announced by the Westlof Tool & Die Co., 428 Bellevue Ave., Detroit,



Mich., showing the versatility of this unit. Schultes four-speed drives are now being applied to power presses,

NICHOLSON CONTROL VALVES

are made in two, three and four-way types for air, oil, water, steam, gas, etc., pressures to 5000 lbs. Style E is a general purpose valve for pressures to

300 lbs. Various metal combinations to suit any medium. Style J is for air and oil only, pressures to 125 lbs. Style H is a balanced hydraulic valve for pressures to 5000 lbs. We also manufacture foot, solenoid and motor-operated valves.



Style J



Style E



Style H

Bulletins on request.

OTHER NICHOLSON PRODUCTS: Mandrels, Arbor Presses, Flexible Couplings, Steel and Stainless Steel Floats, Steam Separators, Steam Traps, Air Separators, Air Traps, Air Vents, Etc.

W. H. Nicholson & Company

117 OREGON STREET

WILKES-BARRE, PA.

"If it's a Spot Welder, we make it"—from a filament .0005" to a door welding.

We manufacture the most complete line of standard and special electric spot welders from $\frac{1}{4}$ to 500 K. V. A., some as low as \$25.00.

We also manufacture special welding transformers to suit your requirements.

Ask for our catalog No. 38W showing over 1250 interesting illustrations — press type air operated, plunger type foot operated and motor driven welders.

Send us your welding problems for quotations.

We manufacture a very complete line of welding tips and water-cooled electrode holders for difficult welding jobs.

We also do Job Spot Welding.

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762 So. 13th St., Near Avon Ave.,
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SPOT WELDING

FOR STRONG
ACCURATE
COMPACT
AIRCRAFT
WORK

LET US QUOTE...



Our new modern plant is fully equipped with special machinery for

**COMMERCIAL JIG BORING,
DESIGNING AND BUILDING
of
DIES, JIGS AND FIXTURES
LARGE OR SMALL**

We can handle your Jig Boring jobs at reasonable prices on our new 18"x36" Pratt & Whitney Jig Borer. Quick service.

Have been delivering satisfaction since 1929—let us serve you.

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SPEED REDUCERS

Abart Reducers are smaller and lighter per H. P. delivered. Write for new catalog now ready.

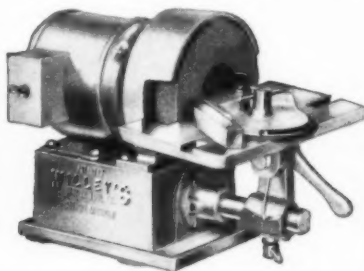
Abart GEAR AND MACHINE CO.
MANUFACTURERS OF
Special Reducers & Gears
4042 W. 131st St. CHICAGO, ILLINOIS

giving variations in the speed of the press without the necessity of slipping belts or changing motor speeds.

The Schultes unit has previously been adapted to lathes, shapers, milling machines, grinders, and drill presses. It provides four speeds, all instantly available by use of an automobile-type gear shift lever. With multiple-speed motors, more speeds may be obtained. The unit is equally well adapted for use with flat or V-belt drives, chain drives, or direct motor drives. A handwheel is provided to facilitate set-up work.

Tungsten Carbide Tool Grinder by Willey's

A new Willey's bench grinder, designed for shaping tungsten carbide tools and masonry drills, has recently been placed on the market by the Willey's Carbide Tool Co., 1344 W. Vernor Hwy., Detroit, Mich.



The grinder is completely self-contained, incorporating a 1/4 h.p. ball bearing motor, single-phase, 60 cycles, 110 volts. A direct current motor can be furnished. A reversible switch, located inside the base, is controlled by a finger-tip lever on the outside. The work table, 11 by 6 inches, is machined of semi-steel. The table has a vertical angular adjustment of 30 degrees, determined by a graduated dial segment beneath the table. The angle between the tool and the face of the wheel is controlled by a protractor tool rest set in a 5/8-inch keyway on the face of the table.

1905 *Strand* 1939

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VERTICAL AND HORIZONTAL TYPES $\frac{1}{8}$ —TO 3 H. P. CAPACITIES

TYPE M7A $1\frac{1}{2}$ H. P.TYPE M10 $\frac{1}{2}$ H. P.TYPE MV4 $\frac{1}{4}$ H. P.

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FLEXIBLE
SHAFTS
THAT ARE
MADE RIGHT
IT PAYS**

N. A. STRAND AND COMPANY

EXCLUSIVE MANUFACTURERS

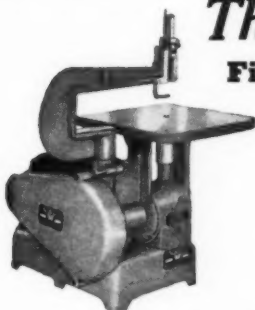
FLEXIBLE SHAFTS - MACHINES AND ATTACHMENTS

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The "BUTTERFLY"

Filing and Die Making Machine



NAMED "BUTTERFLY" BECAUSE IT IS NOISELESS IN ITS RUNNING AS A BUTTERFLY IS IN ITS FLYING.
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NEW MODELS D. & E. L.

"D"—10" table. "EL"—12" table. Saves about 60% or more in labor,—in sawing, filing and lapping on dies, gauges, tools, machine parts, etc.

The "Butterfly" owes its ever increasing popularity to its high standard of efficiency. It is the quietest machine of its kind and is well adapted to highly accurate work. It is being used by the leading manufacturers of the United States and Europe and also by the United States Government.

Write for folder D. and E. L.

Harvey Manufacturing Corp.

MANUFACTURING PLANT AND
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Constructed as per specifications of United States Naval Aircraft Factories.

New design patent applied for.

The Butterfly is mechanically perfect and with it goes an unlimited guarantee.

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Our machine carries the Butterfly trade mark.

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SIMPLEX Arbor Presses

Sturdy, well-built presses. No. 1 has 2 ton capacity—30 to 1 leverage—with widest throat found in units of this type. Maximum diameter of work 9½", 2½" opening in press table. Cash with order price \$15.00. Model No. 21 offers diameter over table of 14" with 3½" arbor opening. Write for descriptive bulletin.



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For die stripping
STRIPPITS
Dependable
Economical

Also Wales patented, individual, sub-press type hole-punching and notching dies.

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THE STRIPPIT CORPORATION
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**Increases
Production**

It gives you just the right speed for the job, with an infinitely variable speed range under finger-tip control. There are no belts to shift. Machines can be located independently of lineshafting. Operation is speedier and more flexible.



You can readily attach "POWERMASTER" to most machine tools with a simple four-bolt mounting.

UNCONDITIONALLY GUARANTEED—

Write for details and price

"POWERMASTER"

25 East Fourth St., New York, N.Y.

The unit is 10½ inches high, with a base eight by nine inches. The surface speed of the grinding wheel is about 5000 feet per minute. The standard wheel is of vitrified silicon carbide, 6 by 1¼ by 2½ inches, 100 grit, mounted on a 6-inch steel plate.

Van Dorn's 1939 Catalog

The Van Dorn Electric Tool Co., Towson, Md., now has ready for distribution its 1939 catalog of portable electric tools and accessories. The new catalog illustrates and describes the entire Van Dorn line of 114 portable electric tools, including several new items not listed in previous catalogs. Many new refinements in design and construction may be noted.

Copies may be had by addressing the makers on your letterhead, and we'll appreciate mention of The BLUE BOOK.

Stanley's No. 150 Contour Grinder

Designed primarily as an aid to tool and die makers, a new Stanley tool, the No. 150 contour grinder, has been placed on the market. It will finish dies, gages, templates, and special shapes.

The grinder is equipped with a ¾ h.p. universal motor available for 110, 125, 150, 220, 230, or 250 volts. The work table is 12 by 12 inches, with an adjustable light fixture as standard equipment. The motor, under the table, may be adjusted through an angle of 45 degrees from the vertical, the tool projecting through a hole in the table top.

Using mounted points of various shapes, up to ¼-inch shank, in the chuck, or using wheels on the arbor, a great variety of grinding operations can be done. It is said that the motor unit can be removed from the holder and used, with special accessories, as a lathe tool post grinder. Complete equipment includes motor, work table, light fixture, chuck, arbor, an assortment of mounted points and rotary files in a wooden block, and a six-foot extension cord.

BEST VALUES ON THE MARKET

10½"

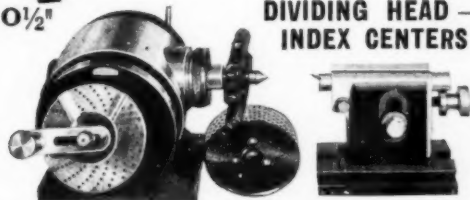
FULL UNIVERSAL DIVIDING HEAD



for Universal Milling Machines—Can be furnished right or left hand. Actual swing 11°. Swivel head stock graduated 180 degrees. Tilts above and below perpendicular. Spindle has No. 10 B. & S. taper front and back with tapered bearing and thrust collar. NEW LOW PRICE **\$170**

10½"

DIVIDING HEAD — INDEX CENTERS



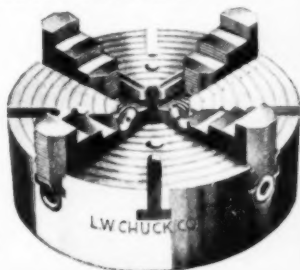
The utmost in a well-balanced, rigid and accurate index center. Swivel stock graduated up to 180 degrees. Head tilts above and below vertical and perpendicular lines. Spindle has taper bearing, with take-up collar for end thrust. No. 10 B. & S. taper has large hole through spindle. NEW LOW PRICE **\$110**

INDEPENDENT CHUCKS

Sturdy semi-steel, heavily ribbed body to withstand strains. Ground finish. Four independent accurately ground and fitted hardened steel jaws. Reversible. 1¼" tough nickel-steel screws. 12" size weighs 75 lbs.

NEW LOW PRICES

10" Size---	\$27.00
12" Size---	31.00
14" Size---	36.00
16" Size---	45.00
18" Size---	58.50



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Lathe Chucks
Dividing Heads
Magnetic Chucks
Demagnetizers
Milling Machine
Vises
Power Hack Saws

Best Values
ever offered!

Send
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L-W CHUCK CO.

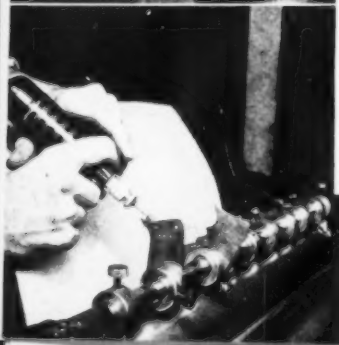
1-7 N. ST. CLAIR ST.,

TOLEDO, OHIO

THE TOOL EVERY

HANDEE

TOOL OF 1001 USES



Consider its superior features; then list the many jobs it will save money and speed up work—on the production laboratory, to handle all sorts of jobs from delicate to instant service on regular production.

FAST

Special custom-built motor develops 25,000 r.p.m.—plenty of speed for any operation. If you require different or variable speeds, inexpensive foot or bench controls are available.

SMOOTH

Precision, selected, grease-sealed, ball-bearing construction insures vibrationless performance.

STURDY

7-segment commutator. Aluminum alloy, seamless housing with shock-proof bakelite ends. Stands hard industrial usage.

LIGHT

Weighs only 12 oz. Perfectly balanced. Can be used all day without fatigue.

AIR COOLED

New type radial fan draws cool air through motor. Can't overheat.

STREAMLINED

Fits the hand comfortably. Handles as easily as a pencil. No awkward bumps or projections on housing.

VERSATILE

Your choice of 300 fine accessories for every kind of work.

PORTABLE

Carry from job to job. Plug in any electric outlet and set up shop on the spot.

ECONOMICAL

Long, trouble-free life with low current consumption.

CHICAGO WHEEL & MFG. CO.

Makers of Quality Products for 40 Years

1101 W. Monroe St., Dept. H.B., Chicago, Ill.

THE TOOL EVERY INDUSTRY NEEDS

in many places in your plant where the Handee
the production line, in tool room or experimental
a delicate carving, and intricate grinding to con-

Join the Rapidly Growing List . . .

Industries great and small are solving their pro-
duction problems with the Handee—recognized
by engineering and efficiency authorities
throughout the world as the greatest value.

New 64-Page Catalog

Complete information on all
Handee Products, including the
largest assortment of accessories
ever presented—one to fit every
special job.

There Are More Han- dees in Use Today Than All Other Similar Tools Combined.

Good Hardware Dealers
and Mill Supply Houses
Everywhere Carry and
Recommend the Han-
dee. Order through
them or direct on 10-
Days Trial.

This
Picture
is
Actual
Size



De Luxe
Model

\$1850

Postpaid

6 Accessories Free

Grinds Sands
Drills Saws
Polishes Sharpens
Cuts Engraves
Routs Cleans
Carves Etc.

ROUTER-SHAPER SET

Three sizes, various accessories available
and catalog for you with the Handee
Router-Shape Set 25 different models and
Ten Handee Router-Shape Set 25 different models
and Ten Handee Router-Shape Set 25 different models



HANNA CYLINDER ORDER ON IT'S WAY!

They must be good to keep customers like this satisfied. Perhaps you too can take advantage of the low first cost of Hanna Cylinders. To further determine this let us send you a copy of Cylinder Catalogue 228.

PUSH--PULL--LIFT--WITH HANNA CYLINDERS

—YOU WILL BE MONEY AHEAD—

HANNA ENGINEERING WORKS

1758 Elston Avenue,

Chicago, Illinois

A. S. T. E. Machine and Tool Progress Exhibition

Next month . . . to be specific, March 13th, will witness the opening of the big Machine and Tool Progress Show at Convention Hall, Detroit.

Judging by the conspicuous success of the 1938 Show, the affair this year should establish new records in every way.

The Committee reports that if it were

to close its books now, the Exhibition would be twice as large as last year. At the rate reservations are coming in it will not be long before the Show is "sold out".

The exhibit will be of paramount interest to everybody connected with industry. It will show the very latest developments in equipment and methods. It will present a real opportunity to see what the development of machines, tools and processes is doing to reduce production costs, improve products, create new jobs and new oppor-

tunities and to raise the standard of living. In addition to the exhibits, there will be evening technical sessions with talks and discussions by leaders in the production world. Confining the technical sessions to the evening leaves the visitors free during the days to study exhibits and visit the many interesting plants in the vicinity of Detroit. In themselves, these inspection tours offer an exceptional educational opportunity.

Most of the exhibits will be shown in actual operation. This gives the on-lookers a chance to study operations and methods of handling the machines.

FEDERAL CUSHIONED MOVEMENT DIAL INDICATOR



SHARP BLOWS—

are cushioned before the impact reaches the movement in this Indicator.

For most applications the normal construction of a Federal Indicator has more than sufficient strength. However, there are occasions when it is necessary to apply an Indicator where it will be subjected to sudden and heavy blows, or to rough treatment in the hands of unskilled workmen.

For such cases specify a Cushioned Movement Indicator.

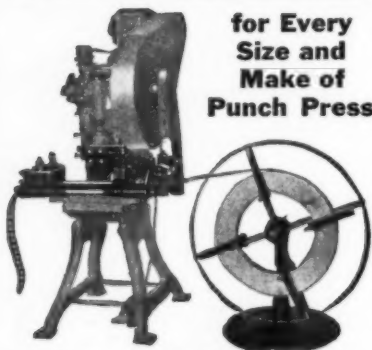
FEDERAL PRODUCTS CORP., 1144 EDDY ST., PROVIDENCE, R. I.

PRECISION MEASURING INSTRUMENTS

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WITTEK

AUTOMATIC ROLL FEEDS



**for Every
Size and
Make of
Punch Press**

**FAST—ACCURATE !
SAFE—AUTOMATIC !**

WITTEK Roll Feeds will protect you and your operators. Presses are kept operating up to capacity—feeding any stock from coils in lengths up to 24" per press stroke—saving in time, dies and production costs. Single roll, double roll and compound types with straightener—fits any press without alterations.



WITTEK Reel Stands—6 models—enable one man to center heavy coils. Ball bearing mounted—adjustable to any height—balanced at any angle—500-lbs. capacity.

Send for Bulletin "HF" giving complete details.

**A size for every
requirement.**

WITTEK MANUFACTURING CO.
4305-9 W. 24th Place, Chicago, Ill.

The Black & Decker "Hornet"

The Black & Decker Mfg. Co., Towson, Md., announces a new $\frac{3}{16}$ " drill, the "Hornet," as an addition to their line. It is said to be a lightweight, compact tool combining high speed, power, and stamina. The manufacturers believe that it is especially adapted to aircraft and light industrial work.



The drill weighs a little over two pounds and is equipped with ball bearings, splined gear mountings, and a universal motor. Two motor speeds, 3700 and 5200 r.p.m., are available.

Please address the manufacturer for further information, mentioning The BLUE BOOK.

Titan Stud Setter

The Titan Stud Setter is a useful tool for setting studs to a uniform degree of tightness without straining or mutilating the threads. The manufacturers claim that the stud setter is applicable to all types of drill presses, air or electric tools, portable or stationary, that it will operate successfully at both low and high speeds, and that it is adjustable for tension and positive in driving.

It is made in two sizes. The No. 1 size weighs 9 lbs. and will take studs as large as $\frac{3}{4}$ " in diameter. The No. O model weighs $3\frac{1}{2}$ lbs. and has a $\frac{1}{16}$ " capacity.

An attractive new two color bulletin gives complete information on the construction of the Titan and its use. Address Titan Tool Co., Fairview, Pa., mentioning The BLUE BOOK.

Silvered Bowl Diffuser

For general lighting of low bay areas in machine shops, assembly departments, metal working shops, printing shops, textile mills and all similar locations, the Lighting Division of Westinghouse Electric & Manufacturing Company has designed the RLM Standard Silver Bowl Diffusers for use with 300 or 500 watt silvered bowl lamps.

The unit consists of a dome shaped

porcelain-enameled reflector which is drawn from No. 22 gauge enamelling grade sheet steel, an inner aluminum reflector formed from No. 18 gauge sheet aluminum and is treated by the Alzak process for greater permanence and ease of cleaning, and a socket assembly. It is supplied either with Locklite hoods for both conduit and 4" outlet box mounting or as a one-piece unit for conduit mounting and is approved by the National Board of Fire Underwriters and R.L.M.



GITS Oilers

• Your lubrication problems, whether large or small, will find the correct answer in the Gits Line. If your requirements are of special nature, send us your specifications.

GITS BROS. MFG. CO.

27 years of oil cup experience

1860 South Kilbourn Ave. Chicago, Ill.

Write for our complete catalog.

The Locklite socket is the two-piece type with one part in the hood and one part in the reflector. Large front connected wiring terminals and straight through wire-ways are provided on the hood portion of the socket, which is the only portion to be wired. As the reflector is given a simple 60° clockwise turn in the hood the socket parts engage and positive electrical contact is made as the hood becomes firmly locked on the reflector. The one-piece type of unit is equipped with a mogul skeleton, easy-to-wire socket with large side connected wiring terminals. All metal parts are nickel plated except the polarizing terminal, which is brass. A cast brass socket adapter tapped for conduit provides a rigid support for the socket.

Fast — Rigid — Accurate No. 39 INDEX High Speed Vertical Mill



Handles 90% of the work done on machines costing five times as much.

Designed for end mill work up to $\frac{1}{2}$ ".

Swivel head is graduated 90° both ways.

Movable quill has $3\frac{1}{4}$ " travel. Mills 8x16" die at one setting. Six speeds — 375 to 2820 r. p. m.

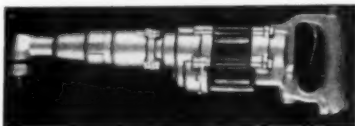
Operates on 110 v.

Let us quote you TODAY.

Blank & Buxton Machinery Co.
Jackson, Mich.

Rotor Offers New Tool Line

A new line of air driven right-angle drills, screw drivers, and nut setters is announced by the Rotor Tool Co., Cleveland, Ohio. The line covers a range of sizes suitable for drilling from $\frac{1}{4}$ " to $\frac{3}{8}$ "; nut setting from $\frac{1}{4}$ " to $\frac{3}{8}$ ", and screw driving from No. 8 wood screws to $\frac{1}{2}$ " machine screws. The tools are designed to meet the need for small tools that will stand rough usage over a period of time. The right-angle feature is said to be preferred by many users even though it may not be needed for the job at hand.



Spindles in a large variety, together with two tool lengths, are available. Special attention has been paid to proper driving bits for Phillips head screws.

A special bulletin covering this new line has been prepared. Please mention The BLUE BOOK in writing.

Federal Products Catalog

A new Federal Products Catalog, just issued, features several new Federal precision instruments. Among the new instruments announced are a comparator or thickness gauge; an internal and external comparator; a thread pitch diameter gauge; a super sensitive comparator; a continuous measuring gauge, for wire or flat material; an adjustable snap gauge with direct reading in ten-thousandths of an inch; and a new automatic grinding gauge representing an improvement over former models.

The catalog, containing 64 pages, is well printed and interestingly written. It contains many illustrations, several showing Federal products in action. BLUE BOOK readers may obtain a copy by writing to the Federal Products Corp., 1144 Eddy St., Providence, R. I., and asking for Catalog No. 38.

NAILES · RIVETS · SCREWS
MADE TO ORDER IN ANY METAL

HASSALL
Products

CLAY & OAKLAND STS.
BROOKLYN, N.Y.

Write for Illustrated Catalog



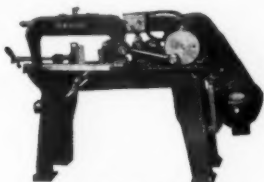
**No. W-3B-Wet Cut, high speed 6'x6'
motor drive**

Fast, Smooth Action—Hydraulic Feed and control—2 speeds standard.

"Standard The World Over"

RACINE

The new, fast cutting, Racine Utility saws—Hydraulic Feed-Dry Cutting or Wet Cutting—Write for remarkably low prices—Also a full line of heavy duty machines up to 14x20" capacity.



No. D-3B Dry Cut 6'x6'

RACINE TOOL & MACHINE COMPANY
1754 STATE ST. -- RACINE, WIS. U. S. A.



Bolts and Screws on Demand

Ready for your profitable use now, this stock of 100 to 150 carloads of TRIPLEX high grade screws, bolts and nuts in most-used sizes and styles is maintained for quick shipment. Wire or write today for samples, prices.

THE TRIPLEX SCREW CO.

CAP AND SET SCREWS, BOLTS, NUTS AND RIVETS

★ 5377 Grant Avenue • Cleveland, Ohio ★

Two New IMPROVEMENTS

MAKE UNIVERSAL DRILL BUSHINGS A BETTER BUY THAN EVER

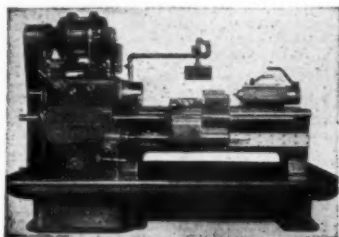


Inset photograph shows Universal Superfinish bore. The exceptional wearing qualities of the combined carbon and nitrogen case—is further improved by honing the bore to a Superfinish. The black dome is a distinctive Universal feature which will add to the appearance of your tools. Write for data sheet TODAY.

UNIVERSAL
Engineering Company
Frankenmuth, Mich.

Seneca Falls Automatic Lathe

An automatic lathe, incorporating several improvements and refinements, has recently been announced by the Seneca Falls Machine Co., Seneca Falls, N. Y. The Model "LR" Lo-Swing, as the new machine is called, is a fully automatic, cam-operated lathe embodying a simplified mechanism for varying the length of the carriage stroke. It is claimed that this device provides economy and accuracy on runs of all types.



The lathe has a 5½-in. swing and is 46 inches between centers in the longest bed length. Being completely mechanical, without clutches, it is said to be easy to service and consistent in its performance. Rotating parts are equipped with anti-friction bearings. The lathe can be either V-belt or gear driven, for finishing or roughing cuts.

In the 16-inch bed length the machine weighs about 4000 lbs. The manufacturer has prepared a bulletin containing complete information and specifications. It will be sent to those interested. In writing, please mention The BLUE BOOK.

Lubrite Bulletin

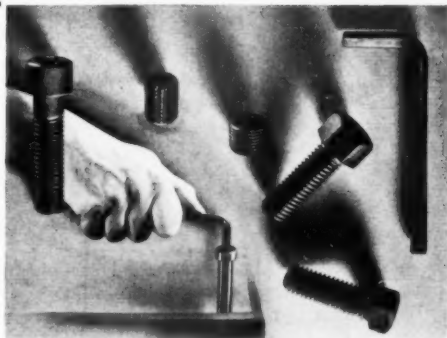
To illustrate their line of "Lubrite" self-lubricating bearings and bushings, Merriman Bros., 185 Amory St., Jamaica Plain, Boston, Mass., have recently issued a 14-page bulletin.

The "Lubrite" products are made of sandcast bronze alloy impregnated, at a pressure of 20,000 pounds per square inch, with a mixture of graphite and

Save 3 Ways with Mac-its!

1. Wherever good practice calls for heat-treated, alloy steel screws, switch to Mac-its for accurate fit, longer life.
2. Wherever you have trouble with ordinary screws breaking, stripping or mushrooming, use Mac-its to cut costs in the long run.
3. Design for compactness, for savings on material and production, by taking advantage of Mac-its' extra strength in smaller sizes.

Get details and prices from your Mac-it distributor, or write for Catalog 38.



The Strong, Carlisle & Hammond Co.
1392 West Third St., Cleveland, O.

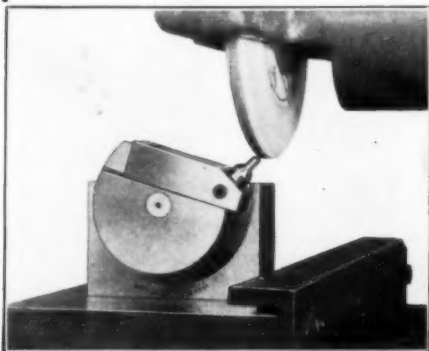
Mac-its
PRONOUNCED
"MACS-ITS"

THE ONLY COMPLETE LINE OF
HEAT-TREATED, ALLOY SCREWS



Speedy!

The WELCH Quick Angle Dresser speeds-up the accurate dressing of grinding wheels to any required angle. It is quick and easy to use . . . accurate and precise in the results obtained.



Precise!

The WELCH Quick Angle Dresser is available in plain or vernier types. Revolving dial on the plain type is graduated in degrees and the zero line is on the base block.

Vernier type has the same graduated revolving dial, with vernier cut into the base block. This is an unusual feature and precludes possibility of the vernier being moved.



After setting dresser to the required angle, tighten knurled hand knob and dresser is ready for use.

Write TODAY for full information and prices.


**RODNEY WELCH
INDUSTRIES**

Makers of HIGH SPEED MILLING CUTTERS
FORM TOOLS and SPECIAL TOOLS


26548 Schoolcraft Avenue,
Detroit, Michigan


STEP PULLEYS




SINGLE GROOVED PULLEYS




VARIABLE PITCH PULLEYS




MULTIPLE DRIVE PULLEYS




FLEXIBLE COUPLINGS




HAND WHEELS



FLANGED PULLEYS



SELF-ALIGNING SHAFT SUPPORTS



**MANUFACTURED AND STOCKED BY
CHICAGO DIE CASTING MFG. CO.
2502 W. Monroe St., Chicago, Ill.
CATALOG ON REQUEST**

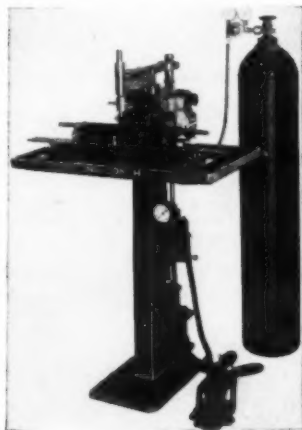
metallic lubricants. They are said to have hundreds of applications where bearings must run without oil, in water, under excessive loads, or exposed to dirt or weather.

They are made as one- and two-piece bushings, flanged bushings, thrust washers, and special designs to meet special requirements.

In writing to the manufacturers, ask for Bulletin 40, as described in The BLUE BOOK.

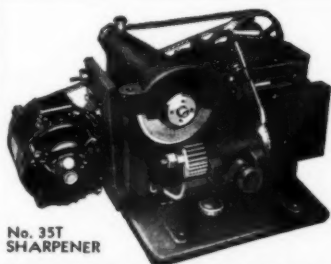
Hydrogen Gas Prevents Oxidation In Spot Welding

To prevent oxidation, discoloration, corrosion, and brittleness in the welding of molybdenum, nickel, and similar metals, Eisler has introduced a spot welding machine equipped with an automatic hydrogen economizer. Hydrogen, directed to the welding spot, is introduced at the time of welding.



The economizer and shut-off valve are arranged to cut off the gas as the weld is finished. This is said to prevent oxidation and brittleness in the metals welded.

Please mention The BLUE BOOK in writing to the manufacturers, Eisler Engineering Co., 750 S. 13th St., Newark, N. J.



No. 357
SHARPENER

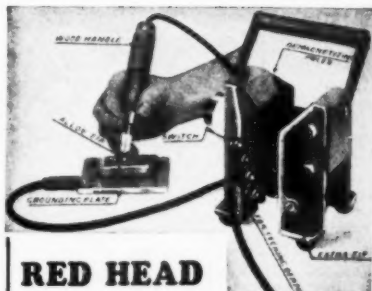
AUTOMATICALLY SHARPENS METAL SAWS IN GANGS

Up to 5½" diameter and up to 1¾" thickness.
100 SAWS of 26 GAUGE CAN BE SHARP-
ENED AT ONE TIME.

The saws are automatically indexed and sharpened within a variation of plus or minus .001 of exact diameter of entire lot.

WRITE FOR CIRCULAR

The WARDWELL MFG. CO.
3165 FULTON RD. CLEVELAND, O.



RED HEAD

ETCHERS and DEMAGNETIZERS

Let us tell you the many advantages of our new D. C. and A. C. models now available. Also, see our new line of Magnetic Parallels and Midget Chucks.

Send **TODAY** for latest circulars

PRINTZ ELECTRIC CO.
14595 KENTUCKY AVE.,
DETROIT, MICHIGAN

MODERN DIE-MAKING MACHINES



S-14 Price \$192.40
Includes: Motor, Electric
Braser, Hand Grinder, Saw
Blade, etc., ready to operate.
Can also be furnished with an electric
butt welder at slightly extra cost.

Here's Value! **GROB** DIE-MAKING MACHINES

A MODERN DIE-FILING MACHINE
AND A DIE-SAWING MACHINE

Complete, ready to operate . . . Both for

\$379.00

This is only one of many economical combinations of Grob Die-Making equipment. There are many more. Ask about them. Over 300 Grob machines in daily use in the Chicago territory alone, sold by Brett Mch. Co., Chicago, Ill.



B-3 Price \$186.60
Includes: Motor,
Stands, 1 Flat File,
etc., ready to
operate.

GROB BROTHERS
GRAFTON, WISCONSIN

Mall's Pneumatic Sanding Drum

An improved pneumatic sanding drum has been announced by the Mall Tool Co., 7742 South Chicago Ave., Chicago, Ill. It is claimed that renewal of abrasive bands and other servicing have been made easier with the new type drum. Other improvements have been made in the band and in the air tube.

The IMPROVED M-B "Super-Speed" Air Grinder

THRILLING
SPEEDS



AMAZING
POWER

• Steel construction throughout . . . Positive quick-acting air control valve. Operates on air pressures of 40-100 pounds. The only hand grinder with spindle speed of 100,000 R. P. M. on 100 pounds air pressure. Also other models and air line filters and automatic air line lubricators.

Write for details.

M-B PRODUCTS
130 E. LARNED ST. DETROIT, MICH.
Export Office: 44 Whitehall St.
New York, N. Y., U. S. A.



Universal Die Cushions for deep drawing, forming die, pressure pad control, and blanking die stripper actions.

Write for engineering power press die booklet.

Dayton Rogers Mfg. Co.
Minneapolis, Minn.

In its design, the drum consists of an aluminum hub, a clincher inner tube, and a rubberized fabric band, protecting the tube. The abrasive band is mounted on the drum by being placed on the rubberized band and then slipped over the deflated tube and hub. The action of the air-cushioned wheel is described as being similar to that of a balloon tire without chatter and with a clean cutting action.

The drum is recommended for use at 900 to 1800 r.p.m. on soft materials. Higher speeds up to 3600 r.p.m. should be employed on harder materials. Abrasive bands for the drum are supplied in various grits:—24 (coarse), 36, 40, 50, 80, and finer. A hand pump for inflating the drum is furnished as standard equipment.

We'll appreciate mention of The BLUE BOOK when you write for further details.

New Louis Allis Motor

A new fan-cooled explosion-proof electric motor has been announced by the Louis Allis Co., Milwaukee, Wis. It is for use in plants where an explosion hazard is present and is said to combine safety with convenience and long life.

The manufacturer claims 18 distinct mechanical and electrical improvements for the new line of motors. The housing is modern and streamlined in appearance.

Please mention The BLUE BOOK in writing to the manufacturer.



AUTOMATIC OILERS

SAVE TIME—OIL—WORRY

OPTOMATICS and LEVOMATICS maintain a constant level of oil in ring and ball bearings.

The **DRIP-DROP** is a thermal oiler dropping oil on the bearing from the top exactly as needed.

TRICO FUSE MFG. CO.
MILWAUKEE, WIS., U. S. A.

WRITE FOR LITERATURE

The Cadillac Two-Speed Blower

The Cadillac two-speed blower and suction cleaner, said to combine the power of a high-speed blower with the safety operation of a low-speed blower, has recently been announced.

The manufacturers point out that while a high-speed blower is advantageous in cleaning most machines, control boards, and bins, the use of a lower air speed is often desirable in cleaning intricate and delicately set up machinery. The Cadillac Model HP provides these two air speeds in one portable blower.

The blower utilizes a universal motor available at voltages from 110 to 275. At high speed the blower gives an air velocity of 26000 lineal feet—176½ cubic feet—per minute with a power input of 890 watts. At low speed the air velocity is 20,500 lineal feet—125 cubic feet—per minute with a power input of 670 watts.

The blower can be converted, by standard attachments, into a sprayer for paints, lacquers, deodorants, or insecticides. When it is used as a suction cleaner at the low speed, pieces of iron and steel which might cause damage, can not be pulled into the fan chamber.

The Cadillac blower is manufactured by the Clements Mfg. Co., Chicago, Ill. In writing, please mention The BLUE BOOK.

Motor Application Chart

An interesting and handy chart cross-listing 25 types of electric motors and about 45 typical applications of these motors is now offered by the Louis Allis Co., Milwaukee, Wis. The motors are classified by speed characteristics, constant, adjustable, and variable speed. The range of horsepower ratings, the starting torque and maximum torque in percentages of full load, speed regulation, and general remarks on the characteristics of the motor are given in each case. Several of the typical applications are checked for each type of motor.

Readers of The BLUE BOOK will receive a copy by writing to The Louis Allis Co., asking for Bulletin 515.

HAMMOND

OF KALAMAZOO

GRINDERS

Tool, Production and Disc
¼ H. P. to 20 H. P.



POLISHERS

1 H. P. to 50 H. P.—A model
for every application



A MODERN, UP-TO-DATE LINE of
Quality Grinders and Polishers.

• Pin our signature to your letterhead for complete literature.

Hammond Machinery Builders
KALAMAZOO, MICHIGAN, U.S.A.
1614 DOUGLAS AVE.



**NO. 1 1/2
GRAND RAPIDS
UNIVERSAL CUTTER
& TOOL GRINDER**

PROVIDING
MAXIMUM CON-
VENIENCE FOR
SHARPENING
CUTTERS &
REAMERS, ETC.

BULLETIN ON REQUEST

GALLMEYER & LIVINGSTON CO.

405 STRAIGHT AVE.
GRAND RAPIDS, MICH.

NO. 2 MACHINE

COMBINING
TWIST DRILL
GRINDING
FEATURE WITH
CUTTER & REAMER
GRINDING



Reducing Die Costs

As a whole, the metal-working industry has made great strides toward maximum efficiency. Constant study of production methods and costs have made possible low prices to the consumer and have changed many products from luxuries to necessities.

These strides have been made almost completely in those branches of industry which, by their nature, lend themselves to advanced production methods. Other branches, where less specialization is possible, have been largely overlooked.

Notable in industry for high production costs and inefficiency are the tool and die departments. Tool and die making has remained a step-child of industry. The Hack Machine Co. has made a definite contribution toward speeding-up the making of tools and dies, with its universal die making machine. It is claimed that with this machine, marathons about the shop from one tool to the next and idle machinery which eats up profits can be reduced to a minimum.

Standard Since 1911

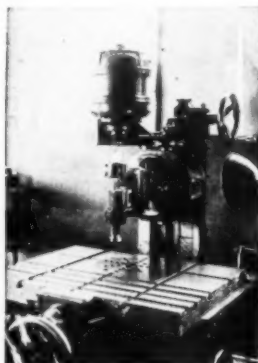


**INCLINABLE
POWER
PRESSES**

**LOSHBOUGH-JORDAN
TOOL & MACHINE CO.**

1525 STERLING AVE

ELKHART, INDIANA

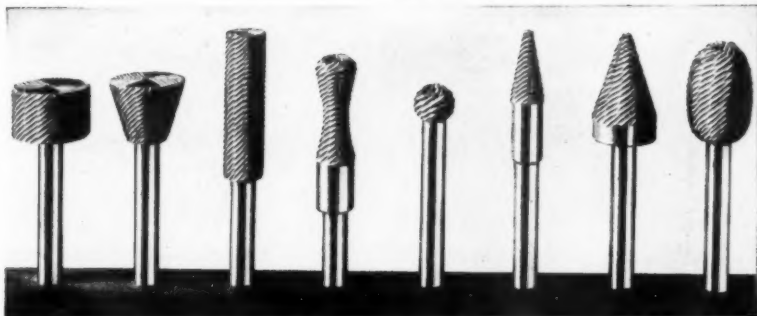


In essence, the Hack machine is a base, a reciprocating rear ram, and a large compound table. To these, various attachments can be mounted to perform every machine operation and many hand operations ordinarily done in the tool and die department. The manufacturer claims that 15 different

Ford Hand Cut



Rotary Files



Just a few of the many standard shapes which are carried in stock

Send for catalog and full information

413
PERSHING AVE.,

M. A. FORD MFG. CO.

DAVENPORT,
IOWA



MARSCHKE

HEAVY DUTY

GRINDERS AND BUFFERS

Don't compare the price of the 1 H.P. MARSCHKE BENCH or PEDESTAL TYPE TOOL GRINDER with machines of similar capacity unless you compare details of design accounting for convenience and safety of operation. Compare, also, the material specifications and standards of workmanship. The Marschke is a quality product and quality is important because *the best is always the cheapest in the end.*

Let us send you the details of this small machine, together with a catalog showing **70 different Grinder and Buffer specifications** of MARSCHKE GRINDERS and BUFFERS.

VONNEGUT MOULDER CORP.

1805 Madison Avenue,

Indianapolis, Indiana



STANDARDIZED

DIE SETS

Machined Steel Semi-Steel

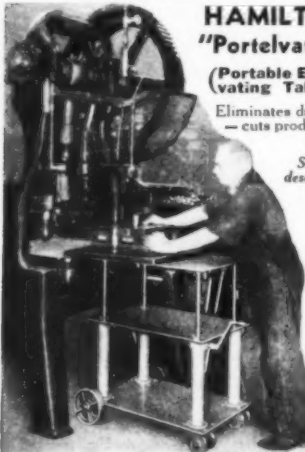
Drop Forged Steel

Headquarters for Standardized Die Sets, embodying many exclusive features and embracing more than 185,000 stock sizes and 46 different styles. A die service that is unsurpassed. Let us prove it!

Write for our new 288 Page Catalog.

E. A. BAUMBACH MFG. CO.
1810 So. Kilbourne Ave., CHICAGO, ILL.

IT'S EASY to place the die in the press with a



HAMILTON

"Portelator"

(Portable Elevating Table)

Eliminates drudgery — cuts production costs.

Send for descriptive folder.

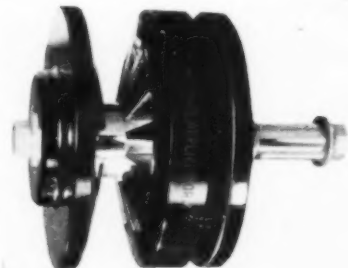
The Hamilton Tool Co., Hamilton, O.

operations are possible with the machine. These include jig boring and milling, slotting, filing, lathe work, drilling, sawing, grinding, lapping, and layout work.

The manufacturer has prepared a new booklet illustrating and describing the machine. Copies may be obtained by writing to the Hack Machine Co., 440 N. Oakley Blvd., Chicago, Ill., and we'll appreciate mention of The BLUE BOOK.

Improved Speedmaster Drive

An improved Speedmaster variable speed pulley is announced by Continental Machine Specialties, Minneapolis, Minn. This transmission was originally developed for use in the company's "Doall" contour band sawing machine, but it was later produced as a separate unit for general applications.



Advantages claimed for the pulley include construction of high impact strength bakelite; pressure lubricated bronze sleeve; infinitely variable speed between the ratios of six-to-one and forty-to-one; use of standard V-belts; and long belt and pulley life.

The new pulley is available in two sizes, a 3½-inch size for drives up to ½ h.p. and a 6½-inch size for drives up to 3 h.p. Control of speed is through a quick action lever or through a hand-wheel which is stated to allow speed control within one r.p.m.

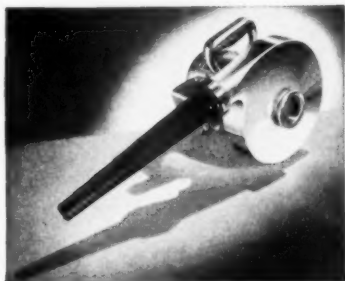
In writing for further information on this new development, please mention The BLUE BOOK.

IT'S NEW!!

1 H. P.—2 SPEED CLEMENTS—CADILLAC BLOWER

and

Suction Cleaner



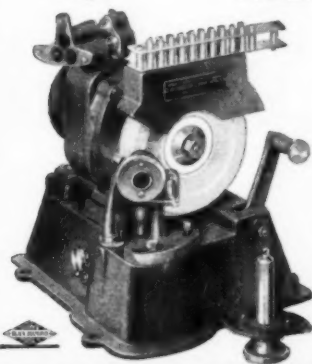
Here is the new Clements—Cadillac 1 H. P. Type, 2 Speed Portable Electric Blower and Suction Cleaner . . . the first with these features ever offered to industry! It consumes but 890 watts while delivering 26,000 lineal feet of clean dry air per minute on high speed and only 670 watts with 20,500 lineal feet at low speed. Capacity at high speed 176½ Cu. Ft. per min.; low speed, 125 Cu. Ft. per min. It is the first Blower to provide **both** high and low speeds so that **all** cleaning can be performed by **one** portable tool.

Write today for complete information.

CLEMENTS MFG. CO., 6650 So. Narragansett Avenue,
CHICAGO, ILLINOIS



Grind Your Drills On
“BLACK DIAMOND”
Precision Drill Grinder



Even an unskilled operator can do a precision job of drill grinding—handles sizes from No. 60 wire gauge to ¾"—easily, quickly and without any complicated adjustments. Saves time, drills and possible damage to the work.

Let us send you Bulletin No. 121-H.

BLACK DIAMOND SAW & MACHINE WORKS, INC.
NATICK, MASS.



The outstanding tool design development of two decades. Use straight shank drills (whole or broken)—Use entire drill or any part of it for given depths—use for single or multiple operations.

Send for detailed information without delay.

Scully-Jones & Company
STANDARD and SPECIAL DRILLING TOOLS
1911 S. ROCKWELL STREET, CHICAGO

New Aluminum Ladder

The Aluminum Ladder Co., 126 Fifth Ave., Tarentum, Pa., has developed a platform-type warehouse ladder said to find wide application in the handling and storing of products on shelves and in bins. Casters make it easily movable from place to place.



The new ladder, solid-type No. 206, is made of 51 S. T. Alcoa Aluminum. Weighing 43 pounds, it is said to be capable of supporting loads of a thousand pounds. The base of the ladder measures 28 by 22 inches, and the platform, 66 inches high, is 22 inches square. Being aluminum, the ladder cannot rust. It is well-built, easily cleaned, and non-sparking.

If you mention The BLUE BOOK, the manufacturer will send full information.

Westinghouse Industrial Motors

Hoist and crane motors, designed to meet exacting electrical and mechanical requirements of severe reversing and plugging service with frequent starting and stopping, is the subject of a 4-page illustrated leaflet recently published by Westinghouse Electric & Manufacturing Company.

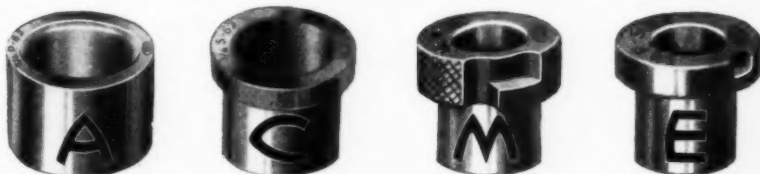
These motors have intermittent ratings of from 1 to 200 horsepower and are designed for operation at commercial frequencies and voltages. Economical operation, sturdy construction, sealed-sleeve bearings, thorough insulation, and a rigorous radio-frequency test are features stressed by the manufacturers.

Copies of this pamphlet, descriptive data 3530, may be secured from the nearest district office, or from headquarters at East Pittsburgh, Pa., and

we'll appreciate mention of The BLUE BOOK.

Hannifin Hydraulic Cylinder Catalog

The Hannifin line of hydraulic cylinders is displayed in a new 16-page bulletin recently issued by the Hannifin Manufacturing Co., 621-631 S. Kohmar Ave., Chicago. The bulletin includes illustrations and dimensions of a large number of different types of hydraulic



STANDARDIZED JIG BUSHINGS

Prompt delivery from stock on over 10,900 standard items—over 6700 ACME Standard—over 4200 A. S. A. Standard—all completely finished ready for use. *Special sizes made to order.*

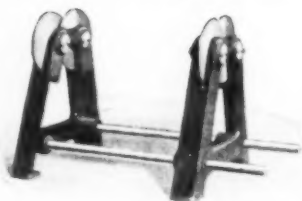
Made in our new plant by the most exacting and scientific methods—insuring accurate fit plus long wear—concentric within .0003" full indicator reading.

Send for bulletin containing complete data and low prices. Satisfactory service guaranteed.

Also manufacturers of complete machine parts, specializing in hardened and ground parts requiring extremely close limits, lapped fits, etc. also hydraulic appliances for pressures up to 20,000 lb. per square inch.

ACME Industrial Co.
210 N. LAFLIN ST., CHICAGO, ILL.

ANDERSON Improved Balancing Ways



Equip your shop with this accepted method of balancing rotating parts—checking, straightening and truing operations.

Anderson Improved Balancing Ways are simple, sturdy and dependable. They save time, effort and trouble—assure better work.

Four chilled iron discs rotate with minimum friction on sensitive special bearings, giving a prompt, sure indication of whether or not the work is in perfect balance.

Swing	Greatest Distance Between Standards	Capacity in lbs.
20 in.	20 in.	1,000
40 in.	30 in.	2,000
60 in.	30 in.	2,000
72 in.	66 in.	5,000
96 in.	88 in.	10,000

Let us tell you more about this and other useful Anderson equipment. Your request will bring full details promptly.

Anderson Bros. Mfg. Co.
1907 Kishwaukee Street,
ROCKFORD, ILLINOIS

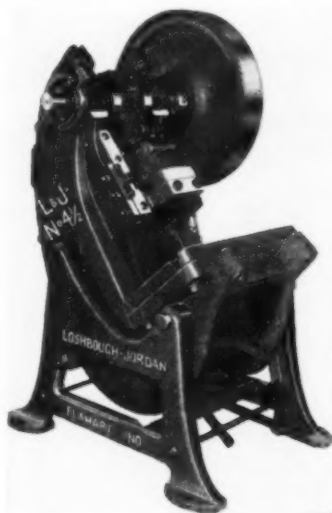
cylinders with various standard mountings. Cylinders with small diameter piston rod, 2 to 1 differential piston rod, and double end piston rod are also included.

Two pages of the bulletin are devoted to cylinders with adjustable cushion on either end or both ends.

Please mention The BLUE BOOK when writing for the bulletin, No. 35-A.

Loshbough - Jordan 36-45 Ton Die Presses

Two inclinable power presses, No. 4, rated at 36 tons capacity, and No. 5, a 45-ton press, are featured by the Loshbough-Jordan Tool and Machine



Co., of Elkhart, Ind. They are made in three styles, flywheel, back geared, and combination geared, with several variations in optional driving equipment, including an automatic brake release and a roller bearing flywheel. Both employ 3 h.p., 1200 r.p.m., motors. Address the company for further information, mentioning The BLUE BOOK.

Thermal Expansion In Mechanical Design

A turbogenerator shaft 25 feet long may be a quarter of an inch longer at operating temperature than it is at room temperature—and such an elongation is serious, unless the designer of the machine anticipates it and does something to prevent damage. The copper in the winding expands even more than the shaft, but the

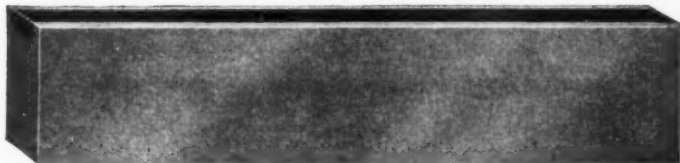
insulation expands very little of its own accord, and so is pulled out of shape. This looks like a knotty problem in itself; yet it is only one of many mechanical design problems recently discussed by C. Lynn, manager of d-c generator engineering of the Westinghouse Electric & Mfg. Co.

A commutator having an eccentricity of 0.001 inch operates satisfactorily, but bar-to-bar roughness or unevenness of only 0.0001 inch, caused by fluctuation in temperature,



TAKE A TIP FROM TALIDE

CHECK THESE PERFORMANCES OF— CENTERLESS GRINDER RESTS



AN AUTOMOBILE MFR. installed **TALIDE-TIPPED** Blades on the Centerless Grinders in their transmission dept., and secured a life of 2 years—where formerly hardened steel blades lasted only 2 to 4 weeks.

A ROLLER BEARING COMPANY put **TALIDE-TIPPED** Blades on a Centerless Grinder operation on hardened rollers and races and obtained 1600 hours service per grind—where previous blades produced only 20 hours service.

A BUSHING MANUFACTURER finish ground 1,000,000 bronze bushings per grind using **TALIDE-TIPPED** Blades—former steel blades produced only 40,000 bushings.

APPLY TALIDE (TUNGSTEN CARBIDE) STRIPS TO YOUR WEAR SURFACES AND LENGTHEN LIFE—INCREASE EFFICIENCY!

STRIPS AVAILABLE IN ANY LENGTH, SHAPE AND SIZE!

METAL CARBIDES CORP. • YOUNGSTOWN, OHIO

ordinarily causes sparking and poor commutation. Prolonged operation at too high a temperature may anneal the copper commutator segments and contribute to mechanical failure.

The rotor of a small induction motor operates at a temperature higher than that of the stator; and, just to make things worse for the designer, the stator punchings ordinarily are not circular in shape and so do not expand symmetrically. Since the air

gap in a small motor is not very large, a very little thermal expansion may cause the rotor to scrape on the stator.

Mr. Lynn hinted that the modern trend in machinery design probably is toward higher operating temperature; consequently, the designer of tomorrow may have to be even more conscious of the thermal characteristics of materials and machine parts.

Die Casting vs. Stamping

Two magazine articles by Herbert Chase, concerning the relative merits of die-casting and stamping in the fabrication of various metal products, have been reprinted for the New Jersey Zinc Co., 160 Front St., New York City. The article describes parts that have been produced — or estimated—by both methods. It thus gives actual cost comparisons and other specific information that make a valuable basis for determination of fabrication methods.

In writing for this booklet, please mention The BLUE BOOK.

FRICTION CLUTCHES

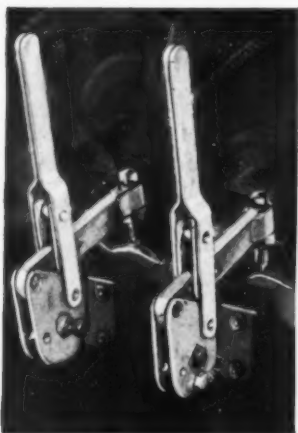
Disc "Type CP"



For countershaft service such as screw machines, turret lathes, etc., especially on brass work for boring and tapping where speed and constant operation makes severe service conditions, the "Type CP" clutch shows its superiority. Write Today.

L. W. Carroll Mfg. Co.

2946 Ross Av., (Norwood) Cincinnati, O.



KNU - SINE TOGGLE CLAMPS

The modern, practical, low cost way to hold production parts for machining, welding, or assembly operations. Quick, positive clamping, and instant release when desired. Several sizes. Ask for catalog.

KNU-LÖK TOGGLE PLIERS

Especially for production, sheet metal clamping. Quick and efficient. Lock automatically, release instantly.



KNU-VISE PRODUCTS COMPANY

Branches:

CHICAGO, ILL.
121 N. Jefferson St.

6436 CASS AVENUE, DETROIT, MICHIGAN

PARIS, FRANCE
54 Rue St. Maur (Xle).

LIVERPOOL, ENG
21 Grovedale Rd., 18

New Cincinnati Tools and Catalog

A new line of general purpose grinders and buffers is announced in the new 48-page catalog of the Cincinnati Electrical Tool Co., Cincinnati, Ohio. It has been designed to furnish quality workmanship and materials at popular prices and includes polishing lathes of from one to five h.p.; a 1/2 h.p. bench grinder and pedestal grinder; a 1 h.p. bench or pedestal grinder; a new pedestal grinder with motors from 2 to 5

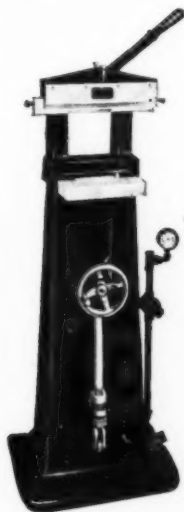
h.p.; 1, 2, 3, and 5 h.p. combination grinder and buffer; and a 1, 2, 3, and 5 h.p. extended spindle buffer. These machines are fully described as a family in the company's bulletin No. 129.

The new catalog also includes the company's complete line of electric drills, screw drivers, nut setters, tappers, aerial grinders, tool post grinders, bench and pedestal buffers and grinders, and high speed cut-off machines.

In writing for this catalog, No. 28, your mention of The BLUE BOOK will be appreciated.

MARKED - IDENTIFIED

Permanently



MODEL 25

PART NUMBERS, CATALOG NUMBERS,
HEAT NUMBERS, SERIAL NUMBERS,
PATENT NUMBERS
MANUFACTURER—INSTRUCTION DATA—INSPECTION

Positive, Permanent MARKING ON YOUR PRODUCTS ASSIST PROSPECTS TO ORDER. MAKES IT EASIER TO BUY—NEW, REPEATS AND REPAIRS. GIVES YOU A DEFINITE RECORD OF PERTINENT DATA ON EACH PART PRODUCED.

The Pneumatic Marking Machine ILLUSTRATED IS OUR HI-DUTY MODEL 25 GENERAL PURPOSE TOOL FOR SHORT RUNS OR PRODUCTION WORK. IT OPERATES FROM YOUR SHOP AIR LINE AND IS ONE OF NUMEROUS MODELS BUILT TO PRODUCE NEAT, PERMANENT MARKINGS QUICKLY ON METAL FABRICATIONS.

WE WILL BE HAPPY TO MAKE SPECIFIC RECOMMENDATIONS UPON RECEIPT OF SAMPLES OR PRINTS OF PARTS TO BE MARKED, SHOWING APPROXIMATE LETTERING, ITS LOCATION ON THE PART, WITH REQUIRED HOURLY PRODUCTION.

**MARKED PARTS ADVERTISE
IN THE RIGHT PLACE, AT THE RIGHT TIME.**

*Unlike John Alden —
"They Speak For Themselves."*

GEO. T. SCHMIDT, Inc.

1802 Belle Plaine Ave., Chicago, Ill.
Builders of Marking Equipment Since 1895.

Send for complete
catalog of our full
line of marking
Tools, Machinery
and Equipment.

The "CHAMPION" EXPANDING MANDREL

is the only Mandrel which completely and accurately fills the hole.

One set of "Champion" Expanding Mandrels—twelve of them—will fill by thousands any inside diameter from $\frac{1}{2}$ " to $6\frac{1}{2}$ ".

Write for Details!



**The WESTERN
TOOL & MFG.
COMPANY**
SPRINGFIELD,
OHIO

GORTON MAKES NEWS

Better products at lower costs are being built today with greater precision and speed in the new Gorton milling machines, duplicators, and pantographs. Prices are offset quickly with savings due to quality construction, convenience, and adaptability of Gorton equipment. Tell us your problems.

GORTON
MACHINE COMPANY

1115 13th St.
RACINE, WISCONSIN

Bench Stand for Signal Drill

A bench stand that with the Signal OB-5 $\frac{1}{2}$ " drill can be converted easily and quickly into a practical and convenient stationary drill press is announced by Signal Electric Mfg. Co., Menominee, Mich. This stand is designated as DS-5 Bench Drill Stand. For production or occasional jobs, its use greatly increases the work range of Signal's OB-5 drill.



The new stand is substantially made, $32\frac{3}{4}$ " high above a base that is 11" in diameter, with a $1\frac{1}{2}$ " diameter column.

Please mention The BLUE BOOK in writing.

CARROLL Universal Dividing Heads

20 Years of Popularity. 6", 10 $\frac{1}{2}$ "
12" Swing, Right or Left Hand
Type.



WM. CARROLL & SON
1776 Lexington Ave.. (Norwood) Cincinnati, Ohio

New Handling Equipment

Designed to meet a need for elevating equipment for short rises (less than 30 feet), the new Oildraulic developed by the Rotary Lift Co., Memphis, Tenn., is expected to gain wide approval in manufacturing plants. By the use of oil as the fluid in the hydraulic system, it is said that corrosion of the piston and wear and tear of other moving parts are eliminated.

The elevator utilizes a seven-cylinder

radial pump, working at high pressures, which makes possible the use of smaller jacks and smaller well holes.

Indian Sales Representation

Mr. Ahmed A. Fazelbhoj, 21 Queen's Rd., Bombay, 4, India, at present a sales representative for several prominent American and European rubber and appliance manufacturers, is interested in representing American machine tool and equipment manufacturers in India.

LONG STROKE—LOW PRICE

Increased Capacity—New Economies In Deep Draw Work

The new No. 1 Rousselle is designed especially for trimming deep die castings and all other types of deep draw work, which formerly required large, heavy presses because of the long stroke needed.

With automatic feed, 10,000 operations per hour are possible. NON-REPEAT clutch stops after each stroke, or can be made to operate continuously.

Check These Specifications:

Weight	450-lbs.
Crankshaft diameter at main bearings	4"
Diameter of crankshaft	1 1/4"
Flywheel weight	120-lbs.
Speed	300-r. p. m.
Diameter of flywheel	16 1/2-inches
Ram standard stroke	2-inches
Adjustment of ram	2-inches
Size of bottom of ram	3x3"
Ram to bed; stroke down adjustment up	6 1/2"
Size of hole in ram for punch	1 1/4"
Bed size	8x12"
Depth of throat to center of ram	4-inches
Size of opening between press frame at back	6-inches
Inclinable angle from right angle	30-degrees
Height	36-inches
Thickness of bolster plate	1-inch

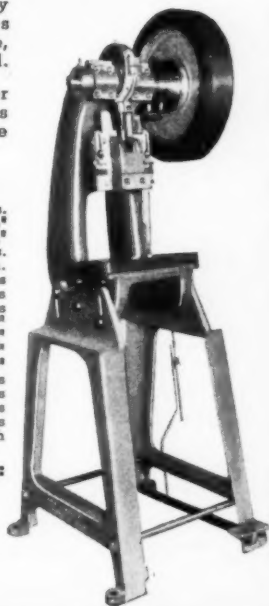
The only inclinable punch press at these prices:

No. 0 Rousselle - - - \$100

No. 1 Rousselle - - - \$150

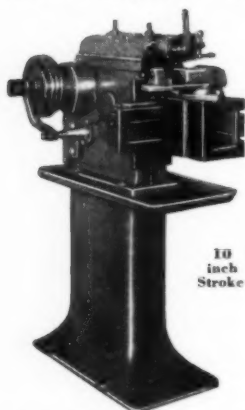
(less motor and stand; stand \$15 extra)

Write for bulletin giving complete information.



DAVID J. ROSS & CO., BENTON HARBOR, MICHIGAN

Precision Shaping Machine



10
inch
Stroke

WITH VARIABLE SELF-ACTING LONGITUDINAL and SELF-ACTING VERTICAL TABLE FEEDS IN EITHER DIRECTION.

TWO RAM SPEEDS, 29 and 52 Strokes per minute.

SWIVELLING TABLE.

TOOL HEAD SWIVELS EITHER SIDE TO 60° and is accurately indexed. The Tool-holder Block and Tool-post also swivel and the Tool Block can be locked with plunger pin. The Tool-post has a positive cam operated locking arrangement.

SPECIFICATIONS:

Maximum Stroke	ins.	10
Self-Acting Longitudinal Table Movement	ins.	11
Self-Acting Vertical Table Movement	ins.	8 3/4
Vertical Feed of Tool-head	ins.	3 3/8
Length of Ram Guides	ins.	16
Width of Ram Guides	ins.	6
Total Length of Ram	ins.	17 1/2
Length of Cross-Slide	ins.	15
Diameter and Width of Single Pulley	ins.	8 x 13 1/2
TABLE: Top Surface x Depth	ins.	9 1/2 x 7 x 7 1/2
VICE: Width x Depth x Opening of Jaws	ins.	3 1/4 x 1 x 2 1/2
R.P.M. of Single Pulley	approx.	200
Floor Space required	ins.	32 x 26
H.P. required for Line-shaft Drive	approx.	1
H.P. of Motor required	approx.	1
R.P.M. of Motor required	approx.	1400
PRICE—Single Pulley Machine		\$300.00
PRICE—Motorized Machine—Without Motor		\$375.00

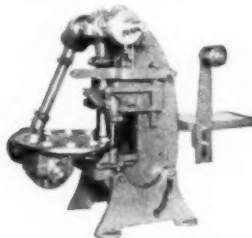
SAMPSON TOOL CO., Inc.

101 Walker St.,

New York, N. Y.

Federal Dial Feeds

The Federal Dial Feed, with many mechanical refinements, has recently been announced by the Federal Press Co., Elkhart, Ind. It has been designed to widen the field of the dial feed, which has commonly been used only for second operations. With the finding of a number of new uses for dial feeds to presses, their use has become much more common.



All moving parts, except the dial plate itself, are completely enclosed, insuring complete safety to operators. There is no need for the operator's getting his hands near danger, for all he must do is place the parts in the dial. It is asserted that this simplicity and safety results in increased production and efficiency. Work, it is said, can be turned out at the rate of from 35 to 60 pieces a minute. This can be increased by adding automatic loading and discharging equipment. Indexing is positive; the dial can be indexed at any fraction of the revolution of the crankshaft, from one-quarter to three-quarters of a revolution. To prevent damage to dies in case of a jam, an auxiliary safety stop can be furnished.

The company's engineering department will advise BLUE BOOK readers regarding any particular job.

Flexrock Bulletins

The Flexrock Co., 23rd & Manning Sts., Philadelphia, Pa., has issued two bulletins, describing their "Rugged-wear" floor resurfacing materials and floor wax. These may be had by writing to the company, and we'll appreciate mention of The BLUE BOOK.

Steel Selecting Guide

To end the guesswork that has always attended the specification of Machinery Steels, the purchaser now may have available a "Machinery Steel Selector". By means of this Selector, the steel specifier is enabled to determine the steel which will suit his purpose—especially in the larger diameters. The Selector shows tensile properties of Machinery Steels in ready-for-use condition, in all diameters up to 8". In addition, information on machinability, comparative cost, heat treating, and special characteristics of the steels, act as a further guide to the right steel.

The "Machinery Steel Selector" is available without charge to anyone who specifies or purchases Machinery Steels, upon request to Horace T. Potts Co., Philadelphia; Brown-Wales Co., Boston, or Beals, McCarthy & Rogers, Buffalo; Equitable Equipment Co., Inc., New Orleans. It is suggested that business connection and position be given when asking for the

Selector, and we'll appreciate mention of The BLUE BOOK.

Hovis Punch and Retainer Catalog

A twelve-page catalog, depicting the company's line of punches, button dies, and retainers, is being offered by the Hovis Screwlock Co., 3125 E. Larned St., Detroit, Mich.

In addition to the familiar Hovis line, several new products are being announced in the 1939 catalog. Among them is a standardized button die which can be used either in a Hovis retainer or as a press fit in a standard reamed hole.

The catalog is printed in two colors and will make a valuable addition to your catalog files.

To obtain a copy, ask the company for catalog C-3, as announced in The BLUE BOOK.

ACE SPOT WELDERS

**For Economically Fastening or Joining
Assemblies of Sheet Metal or Wire**

***Cheaper, Faster and Better
than riveting***

**Spot welds are made in a fractional part of
a second.**

**Average cost of current for 1,000 spot
welds is only 3 cents.**

Modern design, based on simplicity, use of welded steel in place of heavy castings and incorporation of latest developments in resistance welding characterizes these ACE SPOT WELDERS. These factors provide easy, speedy operation, low first cost, low operating cost and dependability. Made in sizes from 5 KW up.

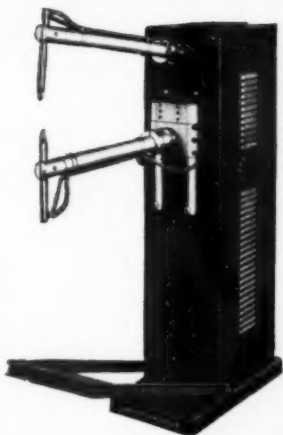
Send for detailed literature and prices today

PIER EQUIPMENT MFG. CO.

WELDING EQUIPMENT DIVISION

643 Cross St., Benton Harbor, Mich.

Makers of Good Equipment Since 1922



LUMA

Combination
Etchtool —
— 3 —
Tools
in 1



Luma Marking and
Demagnetizing SIMULTANEOUSLY

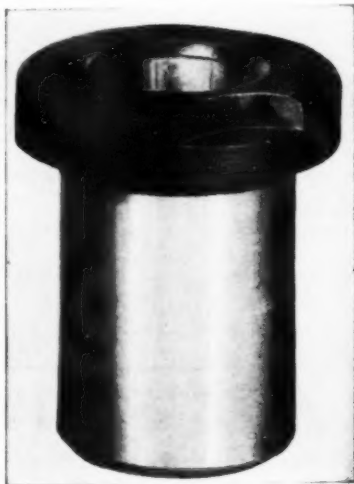
Writes on hardened steel — demagnetizes at the same time—with carbon point does light spot annealing and soldering jobs. Compact—easy to use—dependable.

Send for details—5-day FREE TRIAL OFFER!

Luma Electric Equipment Co.
Dept. H—Main P. O. Box 132, Toledo, Ohio

Universal Drill Bushings

The Universal Engineering Co., Frankenmuth, Mich., announces two recent improvements in their line of drill bushings. It is stated that the bore is now honed to a super-finish which further improves the wearing qualities of the combined carbon and nitrogen case. This super-finished bore

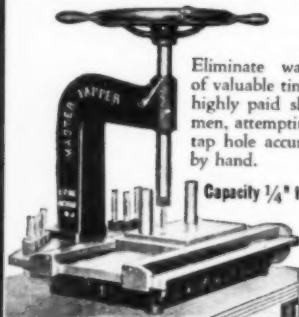


it is explained, also tends to give greater accuracy for round and straight holes. The other development is the new "Black Dome" process—a treatment which gives the bushing head a jet black appearance. It is claimed that this process reduces galling when lubrication is not present. Literature describing these two new improvements may be procured on request from the manufacturer.

Lubricating Trolley Wheels

An ingenious mechanism for automatically lubricating trolley wheels has been developed by the J. N. Fauver Co., 91 Selden Ave., Detroit, Mich. It offers a dependable means of oiling conveyor trolleys which pass through

Precision Tool Room Tapping SAVES TIME—TAPS—TROUBLE

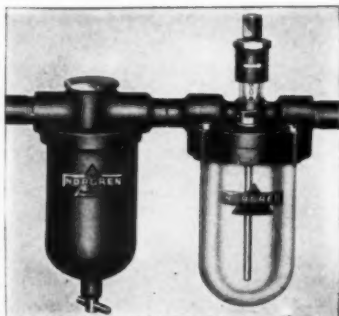


Eliminate wasting of valuable time by highly paid skilled men, attempting to tap hole accurately by hand.

Capacity $\frac{1}{4}$ " to $\frac{3}{8}$ "

The Master Tapper Co.
2 Main St., Belleville, N. J.

The Vitalizer Unit That Conditions Air For Power.



The Norgren Strainer removes grit, scale and approximately 92% of the moisture — the Norgren Lubricator automatically oils the air stream. Result — vitalized air power, a spur to air tools.

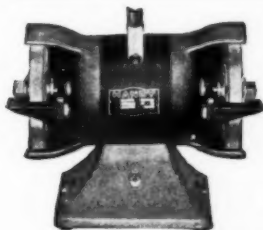
Write for circular and prices.

C. A. NORGREN CO., Inc.

214 Santa Fe Drive

--

Denver, Colorado



STURDY BUILT-- *for Long, Hard Service*

A complete line—6" to 12"; Bench and Pedestal Types; All Heavy Duty, Ball Bearing; Price range, \$19.50 to \$197.00.

1 YEAR GUARANTEE.

ABOVE, No. 548, 1/4 H. P.	\$ 19.50
AT RIGHT, No. 121, 2 H. P.	\$197.00

BALDOR ELECTRIC COMPANY
4368 Duncan Ave., St. Louis, Mo.

BALDOR
BALL BEARING **GRINDERS**



kilns, ovens, or washers, where breakdown or dilution of lubricants is encountered.

The device is mounted on the top of the rail. As each wheel passes it, a trigger is tripped, releasing jets of oil fog into the wheel bearings. Compressed air from the plant lines is stepped down to proper operating pressure by a Norgren reducing valve and then enters a Norgren air line lubricator where the proper amount of oil is introduced into the air stream. The Norgren blow valve is actuated by the trigger, releasing the fog of oil. An attachment is available for lubricating the chain link pins as they pass under the lubricator.

The standard reservoir capacity is 1½ pints, with larger capacities available. The lubricator is built of cast aluminum and cold rolled steel. It can be attached to the conveyor rail by three machine screws.

In writing to the manufacturer for further information, please mention **THE BLUE BOOK**.

Grinding Wheel Dressers

We make
all types
of
Dressers
and
Cutters



Write
for
Catalog
"H"

DESMOND-STEPHAN MFG. CO.
URBANA, OHIO

*The Canadian Desmond-Stephan Mfg. Co., Ltd.
Hamilton, Ontario, Canada*

Add-A-Bin

A neat, compact, and efficient means of storing small parts is provided by the Add-A-Bin, introduced by the Noggle Products Co., Ann Arbor, Mich.



The system consists of a housing and various sizes of individual bins, available separately. This permits the user to make up his own combination of bins to suit his own requirements. The bins are balanced so that when one contains any material at all it will close automatically when the hand is removed.

The unit bins are made in two series, three inches and four inches high. They are of welded construction, made of 26-gauge steel, finished in green enamel.

Modern Shops Prefer—The Handnib—

for Toolroom, Sheet Metal and Experimental Work—saves up to 90% on templates and trial blanks by eliminating costly hand work. Cuts sheet metal into any shape desired in one-tenth of the time usually required. Also cuts drill rod.

A HANDNIB quickly pays for itself with the savings which it makes possible. Send **TODAY** for descriptive folder.

NATIONAL MACHINE TOOL CO., Racine, Wis.



LATEST EQUIPMENT CATALOGS

Check the Items in Which You Are Interested and Mail to
Hitchcock Publishing Co., 508 South Dearborn, Chicago

Please limit your choice to the ten items in which you are most interested.

- | | | | |
|---|---|--|--|
| <input type="checkbox"/> Abrasive, cloth, paper | <input type="checkbox"/> Cement, disc grinding wheel | <input type="checkbox"/> Drill Bushings | <input type="checkbox"/> Gears, rawhide and non-metallic |
| <input type="checkbox"/> Adapters, adjustable | <input type="checkbox"/> Centering Machines | <input type="checkbox"/> Drills, electric | <input type="checkbox"/> Gear Pumps |
| <input type="checkbox"/> Arbors & Mandrels | <input type="checkbox"/> Centers, lathe | <input type="checkbox"/> Drill grinders | <input type="checkbox"/> Generators |
| <input type="checkbox"/> Balancing Ways | <input type="checkbox"/> Chains, silent, roller | <input type="checkbox"/> Drill speeders | |
| <input type="checkbox"/> Baling Presses | <input type="checkbox"/> Chain Drives | <input type="checkbox"/> Drill Twist | |
| <input type="checkbox"/> Band Saw Machines | <input type="checkbox"/> Chamfering Machy, auto. | <input type="checkbox"/> Drills, attachments, high speed | <input type="checkbox"/> Goggles |
| <input type="checkbox"/> Bar Cutters | <input type="checkbox"/> Chucks | <input type="checkbox"/> Drills, automatic | <input type="checkbox"/> Grease |
| <input type="checkbox"/> Bars, boring | <input type="checkbox"/> Chucks, air | <input type="checkbox"/> Drills, bench | <input type="checkbox"/> Grinders, pneumatic |
| <input type="checkbox"/> Bearings, Ball | <input type="checkbox"/> Chucks, auto. | <input type="checkbox"/> Drills, fully geared | <input type="checkbox"/> Grinders, air |
| <input type="checkbox"/> Bearings, oilless | <input type="checkbox"/> Chucks, collet | <input type="checkbox"/> Drills, multiple spd. | <input type="checkbox"/> Grinders, bench |
| <input type="checkbox"/> Bearings, roller | <input type="checkbox"/> Chucks, combination | <input type="checkbox"/> Drills, portable elec. | <input type="checkbox"/> Grinders, disc |
| <input type="checkbox"/> Bearings, tapered roller | <input type="checkbox"/> Chucks, drill & tap | <input type="checkbox"/> Drills, radial | <input type="checkbox"/> Grinders, external |
| <input type="checkbox"/> Bearings, thrust | <input type="checkbox"/> Chucks, geared scroll | <input type="checkbox"/> Drills, sensitive | <input type="checkbox"/> Grinders, flex. shaft |
| <input type="checkbox"/> Bolt Fasteners, metal, leather | <input type="checkbox"/> Chucks, lathe | <input type="checkbox"/> Drives, variable | <input type="checkbox"/> Grinders, hand |
| <input type="checkbox"/> Belt Lacing | <input type="checkbox"/> Chucks, magnetic | | <input type="checkbox"/> Grinders, internal |
| <input type="checkbox"/> Belt Sanders | <input type="checkbox"/> Clamping devices, air operated | <input type="checkbox"/> Emery Wheels | <input type="checkbox"/> Grinders, ped., elec. |
| <input type="checkbox"/> Belts, V Type | <input type="checkbox"/> Clutches | <input type="checkbox"/> End Mills | <input type="checkbox"/> Grinders, swg. frame |
| <input type="checkbox"/> Bending Machines, hand | <input type="checkbox"/> Coil Winding Equip. | <input type="checkbox"/> Engraving Machines | <input type="checkbox"/> Grinders, pol., belt |
| <input type="checkbox"/> Bending Machines, power | <input type="checkbox"/> Collets, feed fingers | <input type="checkbox"/> Etching Mach., elec. | <input type="checkbox"/> Grinding Attach. |
| <input type="checkbox"/> Bending Machines, angle iron | <input type="checkbox"/> Comparators | <input type="checkbox"/> Exhaust Blowers | <input type="checkbox"/> Grinding, centerless (contract) |
| <input type="checkbox"/> Bending Machines, hydro | <input type="checkbox"/> Compressors, air | <input type="checkbox"/> Extractors, tap | <input type="checkbox"/> Grinding Mch., belt |
| <input type="checkbox"/> Bending Machines, pipe | <input type="checkbox"/> Controllers | <input type="checkbox"/> Facers, spot | <input type="checkbox"/> Grinding Mch., inter. |
| <input type="checkbox"/> Bending Rolls | <input type="checkbox"/> Conveyors | <input type="checkbox"/> Fans, exhaust, elec. ventilating | <input type="checkbox"/> Grinding Mch., cut, reamer and tool |
| <input type="checkbox"/> Blocks, chain | <input type="checkbox"/> Counterbores | <input type="checkbox"/> Files | <input type="checkbox"/> Grinding Machines, portable elec. |
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| <input type="checkbox"/> Bolt & Nut Machy. | <input type="checkbox"/> Couplings, shaft | <input type="checkbox"/> Filing Room Equip. | <input type="checkbox"/> Grinding Service |
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| <input type="checkbox"/> Boring & Turn. Mills | <input type="checkbox"/> Cranes, portable | <input type="checkbox"/> Floating Holders | |
| <input type="checkbox"/> Boring Machines, jig | <input type="checkbox"/> Cut-off machines | <input type="checkbox"/> Forges | <input type="checkbox"/> Hack Saw Blades |
| <input type="checkbox"/> Boring Tools | <input type="checkbox"/> Cutter grinders | <input type="checkbox"/> Forging (Upsetting) Machinery | <input type="checkbox"/> Hack Saw Machines |
| <input type="checkbox"/> Brakes, hand, power | <input type="checkbox"/> Cutters | <input type="checkbox"/> Forgings, drop | <input type="checkbox"/> Hammers, port, elec. |
| <input type="checkbox"/> Brazers, electric | <input type="checkbox"/> Cutting Compounds | <input type="checkbox"/> Forgings, upset | <input type="checkbox"/> Hammers, drop |
| <input type="checkbox"/> Broaching Machine Tools | <input type="checkbox"/> Cylinders, air | <input type="checkbox"/> Forming Machines | <input type="checkbox"/> Hammers, forg. air |
| <input type="checkbox"/> Buffers | | <input type="checkbox"/> Foundry Equipment | <input type="checkbox"/> Hammers, helve riv. |
| <input type="checkbox"/> Bulldozers | <input type="checkbox"/> Demagnetizers | <input type="checkbox"/> Furnaces, hardness | <input type="checkbox"/> Hammers, power |
| <input type="checkbox"/> Burnishing Machy. | <input type="checkbox"/> Diamonds | <input type="checkbox"/> Furnaces, heat treating, Electric | <input type="checkbox"/> Hammers, soft |
| <input type="checkbox"/> Bushings, brass | <input type="checkbox"/> Diamond Tools | <input type="checkbox"/> Furnaces, heat treating, oil or gas | <input type="checkbox"/> Hammers, steam |
| <input type="checkbox"/> Bushings, bronze | <input type="checkbox"/> Die casting machines | | <input type="checkbox"/> Hand Saws, p. elec. |
| <input type="checkbox"/> Bushings, hardened | <input type="checkbox"/> Die Sets | <input type="checkbox"/> Gages | <input type="checkbox"/> Hobbing Machines |
| <input type="checkbox"/> Bushings, jig | <input type="checkbox"/> Die Sinking Machines | <input type="checkbox"/> Gage Blocks | <input type="checkbox"/> Hobs |
| <input type="checkbox"/> Bushings, steel | <input type="checkbox"/> Die Stocks | <input type="checkbox"/> Gages, comparator | <input type="checkbox"/> Hoists, chain |
| | <input type="checkbox"/> Die Cushion | <input type="checkbox"/> Gages, dial | <input type="checkbox"/> Hones |
| | <input type="checkbox"/> Die Duplicating Machines | <input type="checkbox"/> Gages, plug, ring, snap | <input type="checkbox"/> Honing Mch., cyl. |
| | <input type="checkbox"/> Die Filers | <input type="checkbox"/> Gages, taper | <input type="checkbox"/> Hose rub. metallic |
| | <input type="checkbox"/> Dies, blank, forming | <input type="checkbox"/> Gears | <input type="checkbox"/> Hydraulic Machinery and Tools |
| | <input type="checkbox"/> Dies, hole punching | <input type="checkbox"/> Gear Blanks, non-met. | |
| | <input type="checkbox"/> Dies, thread rolling | <input type="checkbox"/> Gear Cutting Machy. | <input type="checkbox"/> Index Fixtures |
| | <input type="checkbox"/> Dies | <input type="checkbox"/> Gear Testing Machy. | <input type="checkbox"/> Indicators |
| <input type="checkbox"/> Cabinets, filing | <input type="checkbox"/> Dividing Heads | <input type="checkbox"/> Gears, thread | |
| <input type="checkbox"/> Cabinets, tool | <input type="checkbox"/> Dowel pins, steel | <input type="checkbox"/> Gears | |
| <input type="checkbox"/> Case Hardening Furnaces | <input type="checkbox"/> Drafting Machines | <input type="checkbox"/> Gear Blanks, non-met. | <input type="checkbox"/> Jig Boners |
| <input type="checkbox"/> Castings | <input type="checkbox"/> Drawing Instruments | <input type="checkbox"/> Gear Cutting Machy. | <input type="checkbox"/> Jigs & Fixtures |
| | <input type="checkbox"/> Dressers | <input type="checkbox"/> Gear Testing Machy. | |
| | <input type="checkbox"/> Drill Presses | <input type="checkbox"/> Gears, cut | |

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☐ Patterns
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☐ Pins, leader & dowl.
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☐ Reamer Holders
☐ Reamers
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☐ Riveting Machines
☐ Rod Cutters
☐ Rope drives
☐ Rotary Converters

☐ Rotary Files
☐ Router Bits

☐ Sand Blast equip.
☐ Sanders
☐ Saws
☐ Saw Sharpening Mch.
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☐ Screws, set & machine
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☐ Shears, throatless
☐ Shears, rotary
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☐ Sheave wheels
☐ Shelving steel
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☐ Sine Bars
☐ Slottting machines
☐ Sockets
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☐ Speed Reducers
☐ Spring coiling and forming machy.
☐ Sprockets
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☐ Taps, collapsing
☐ Thread Grind. Mch.
☐ Thread Rolling Mch.
☐ Tool bits, hi. sp. st.
☐ Tool Holders
☐ Toolmakers Instrumts.
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☐ Tools, cutting
☐ Tools, filing
☐ Tools, lathe & plan.
☐ Tools, machinists'
☐ Tools, sawing
☐ Tracing cloth and paper
☐ Transmission var. sp.
☐ Tube Flang. Mch.
☐ Tumbling Barrels
☐ Turning Tools

☐ Universal Joints

☐ Valves, hydraulic
☐ V Belts
☐ Vises, bench
☐ Vises, machine
☐ Vises, pipe
☐ Vises, planer & shap.

☐ Washers, lock
☐ Welding Equipment
☐ Welding & Cutting Gases
☐ Welders, arc
☐ Welders, portable
☐ Welders, elec. spot
☐ Welding Gen., arc
☐ Welding Mch., resist.
☐ Wire-Working Mch.
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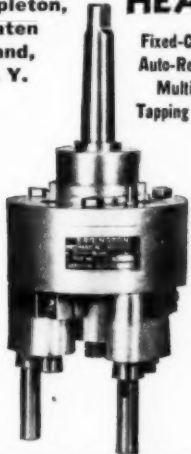
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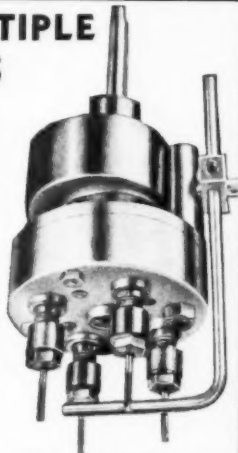


**Super-Sensitive
Fixed-Center
Drilling Heads**

**ADJUSTABLE
MULTIPLE SPINDLE
DRILLING HEADS**



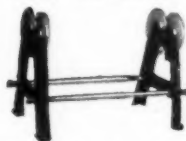
**Fixed-Center
Auto-Reverse
Multiple
Tapping Heads**



**All Parts Fully Enclosed
to Insure Pressure
lubrication.**

Ideal's Balancing Ways

The Ideal Commutator Dresser Co., 1441 Park Ave., Sycamore, Ill., has recently introduced a compact unit for the static balancing of motor armatures. Three standard sizes are available: 10-inch swing, having a capacity of 300 lbs.; 20-inch swing, capacity 1000 lbs., 42-inch swing, with a capacity of 1000 lbs. All three sizes are made in several shaft lengths.



The semi-steel discs are mounted on ball bearings, and no centers are required. The unit can be placed on the floor or bench, ready for use. The standards are adjustable to handle any armature up to the limits of the unit.

Write to the company for further information.

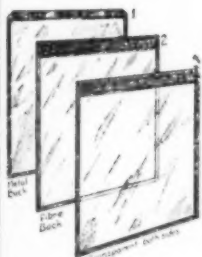
Boice-Crane's New Drill Press and Saw

The Boice-Crane Co., Toledo, Ohio, offers a new line of medium duty drill presses, in addition to their present line of light duty drills.

The manufacturer reports that the new drill press line features a new six tooth spline drive, with teeth of the new involute type. Another interesting feature is the steel driving sleeve of large diameter, in which the internal splines are broached, and to which two of the main grease-sealed ball-bearings are mounted. Two more grease-sealed ball bearings complete the mounting of the spindle, a total of four ball bearings. Bearing seats of the latter two bearings are spaced extra wide to increase spindle support.

The portion of the head actually housing the spindle quill and the quill

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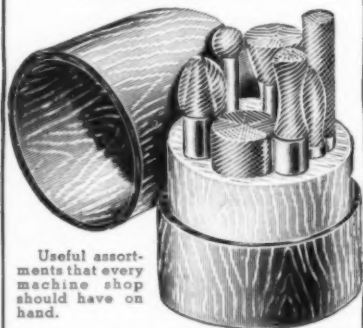
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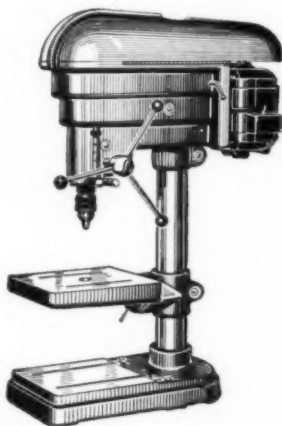


Useful assortments that every machine shop should have on hand.

Ask for catalog **WR**

Grobet File Corp. of America
3 PARK PL. NEW YORK

itself is extra long. The advantage of this is that it leaves as much quill within its bearing in the housing when quill is fed out to the limit, as extends outside it—a feature that manufacturer says guarantees accuracy in deep boring, routing and mortising. Designed



into the machine is a drive guard—standard equipment on all models.

The manufacturer is offering standard bench and floor models with slotted, or oil trough machine shop type table; also 2 and 4 spindle multiples for bench mounting. Foot feed and high speed tapping attachments are also available.

The company also announces a new model of its No. 2500 Tilting Arbor Saw.

Among the new features is a recently perfected quick-acting triple-purpose ripping fence control. A single control handle now fast feeds, micro-feeds for close setting, and securely locks the ripping fence. A second control locks the rear end of the ripping fence when necessary. The ripping fence is carried on a calibrated tubular bar on the

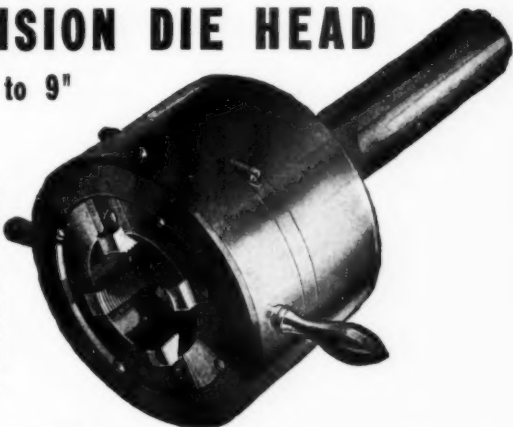
A PRECISION DIE HEAD

21 SIZES $\frac{3}{8}$ " to 9"

Model F

This stationary Die Head is time tested—used on all types of machines. Head opens at end of cut—adjustment to cut as little as $\frac{3}{32}$ " of thread.

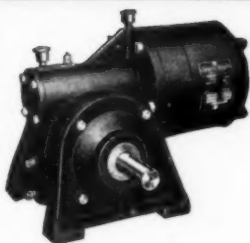
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RWIP—a right angle, worm and combination worm and planetary gearing style of reducer.

Motorized Speed Reducers

10 DIFFERENT STYLES

from which to select the exact type of speed reducer to meet your individual requirements.

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The diversity of the Janette custom built line of motorized speed reducers, enables us to supply a machine for almost any purpose.

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ROTARY CONVERTERS — MOTOR GENERATORS — BLOWER WHEELS

Janette Manufacturing Company

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MICROMETER OFFSET BORING HEADS



No. 35

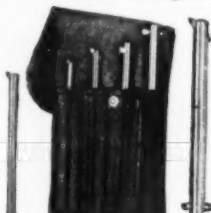
\$60.00

A New Flynn Micrometer
Offset Boring Head

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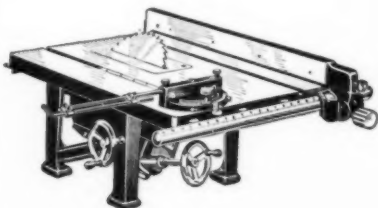
Boring Bars

The new small
bars $\frac{3}{16}$, $\frac{1}{4}$, $\frac{5}{16}$
and $\frac{3}{8}$ in. dia.
Set of 4—\$5.
Larger bars
up to $1\frac{1}{2}$ in.
diameter.



Flynn Manufacturing Company
435 Bates Street Detroit, Michigan

front. One model rips to 21" wide, a second model to 37" wide.



The table size is 20" x 27". Bench and floor stand models with motors from $\frac{1}{2}$ to $1\frac{1}{2}$ h.p. are available.

The manufacturers will send their new 1939 catalog giving complete data and prices on request and we hope

A New C-P Electric Sander

Featuring the "finger-tip gear shift" found in today's automobiles, a new two-speed electric sander is offered by the Chicago Pneumatic Tool Co., 6 East 44th St., New York City. Two buttons in the switch handle are de-



signed to facilitate speed changing. The unit is available in two sizes, standard duty and heavy duty, each accommodating 7 or 9-inch discs.

The company also manufactures single-speed sanders in three styles. These models include a 7-in. standard duty sander, a 7-in. heavy duty sander, and a 9-in. standard duty sander.

Standard models are designed to operate on 110 or 220-volt power, but models operating on 32 volts or 250 volts are also available.

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Burke Machine Tool Co.
297 E. 16th St., Conneaut, Ohio

Covel Dual Drill Grinder

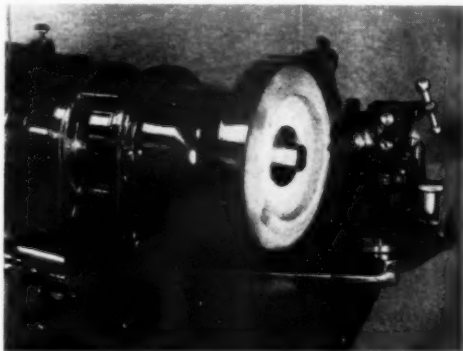
Because dual drills have been difficult to sharpen and recondition, their extensive adoption for drilling holes of two diameters has been retarded. A new attachment has been designed by Covel for use with a Yankee Grinder.

In the operation of the attachment, the grinding wheel is first dressed to the proper size and shape. The drill is then inserted in the spindle of the attachment and positioned by the indicating finger. The attachment is turned by hand. Dressing the wheel can be accomplished by turning it on a diamond inserted in the spindle. The wheel can be revolved about its circular base, allowing the dressing of the wheel to any desired angle. 2-fl, 3-fl, or 4-fl drills can be ground by use of the attachment.

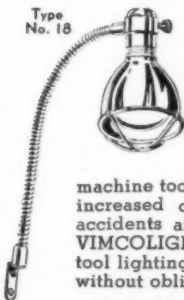
Although it has been primarily designed for use with

the Yankee Grinder, the attachment can be adapted for use with other grinding machines, provided a cup wheel about 10 inches in diameter is available. The device will grind drills up to 1 3/8 inches in diameter.

For details please address Covel Mfg. Co., Benton Harbor, Mich.

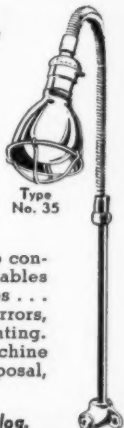


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"Hacksaw-ology"

That's the intriguing and unusual title of a new booklet recently published by the Simonds Saw & Steel Co. This 24-page booklet, containing many valuable hints and suggestions for the use of hack saw blades, is well illustrated and printed. Among the subjects covered are the history of hack saws, use of hack saw blades

by hand, suggestions for machine use, and the use of hard edge band saws.

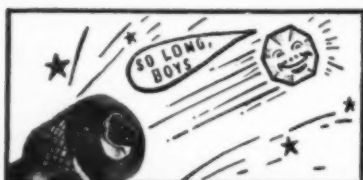
The booklet also illustrates the Simonds line of metal-cutting equipment. It should prove an interesting and valuable addition to the shop library.

To receive a copy, write to the Simonds Saw and Steel Co., Fitchburg, Mass., mentioning The BLUE BOOK.

Two New Landis Tools

The Landis Machine Co., Waynesboro, Pa., has announced two new machine shop tools, a sliding adapter for the application of "Landmatic" heads to turret lathes, and a new chaser grinder.

The adapter permits a floating action for the die head and also provides a gear mechanism for starting the die head onto the work by hand. This construction is said to relieve the head



THAT CAN'T HAPPEN WITH A DIAMOND-IMPREGNATED CARBOLEY GRINDING WHEEL DRESSER

The diamonds in Carboley Dressers can't come loose. They are actually "wetted" to a special matrix and permanently held in place. With Carboley Dressers you eliminate all remounting expense—and save at least 25% on dresser costs on all rough, semi-finish and finish dressing jobs. Send for Catalog DR-38.

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Columbia's



Industry's most
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VARI-SPEED CONTROLS

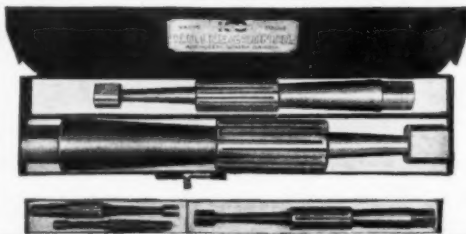
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- Full 5 to 1 Speed Ratio
- Fractional to 7½ H. P.
- Self Contained.
- Low First Cost.

Columbia Vari-Speed Co., Wheaton, Ill.

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1001 MANDRELS

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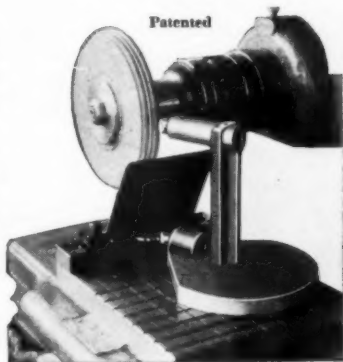
That's just part of the saving with a "B-K" Wheel Contour Dresser.

Complicated set-ups are eliminated. There are no exacting measurements. No special skill is required to dress a wheel exactly in accordance with the template. Form cutters may be ground profitably from the solid. Duplication of ground parts is absolutely assured. There are no loose parts or exasperating adjustments. Adapted to any grinder carrying an 8-inch or smaller wheel.

Let us tell you all about it.

BRICKNER-KROPF MCH. CO.
MUSKEGON HEIGHTS, MICH.

Descriptive circular and price on request.



It Files, Chips, Saws, Routs and Cuts . . .

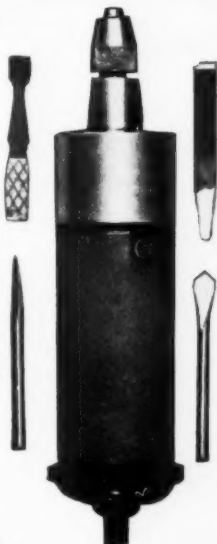
HOOVER **Multi-Purpose Tool**

A new and different tool for Die Makers, Engravers, Patternmakers and Artists in Wood, Stone, Bronze, Aluminum and other metals. It provides a powerful reciprocating motion (back-and-forth—NOT ROTARY) with $\frac{1}{2}$ " tool movement. Chipping capacity is $\frac{1}{8}$ "—in filing or sawing $\frac{1}{4}$ ". May be used with a wide variety of tools, four typical examples of which are shown. The HOOVER is small, light, well-balanced—easy to hold and use. Invaluable for all kinds of tough routing, filing, chipping, sawing, and chiseling jobs. Workmanship and material are fully guaranteed.

Price—\$19.50 each net.

Write for full details. Dealers' inquiries solicited.

HOOVER TOOL CO., Anderson, Ind.



Centerless Grinding

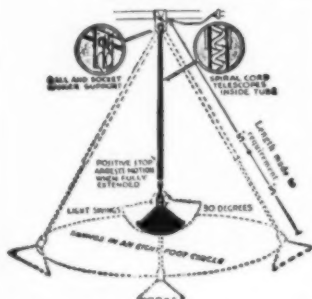
(CONTRACT WORK)

Precision, Accuracy, Promptness

Let us quote on your specifications.

THE HEIM COMPANY
Fairfield, Connecticut

Universal Movable ZIG-ZAG Light Support, Stays Put



Universal movable lights for better industrial illumination . . . stay-put where you leave them . . . push-up, pull-down or swing-around. A type for every need. Write TODAY for descriptive folder and state where you wish to apply it.

J. Zagora Machine & Gear Co.
1321 So. Mint St., Charlotte, N. C.

of the heavy load of the turret and carriage, providing a more accurate lead and better quality thread.

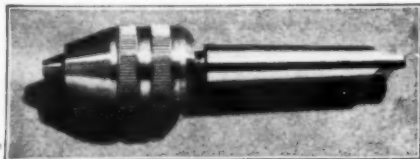
The chaser grinder, made in three models, was designed to grind tangential chasers to the correct lead and rake angles. It is said that although a special chaser grinder is not absolutely necessary to the operation of the Landis die head, the accuracy with which the chasers are ground will be reflected both in the quality of the thread produced and in the life of the chaser.

In writing to the manufacturers for further information on these new developments, please mention The BLUE BOOK.

Lubricating Oven Conveyor Chains

Conveyor chains operating in high temperature zones, such as in baking and enameling ovens, can now be more effectively lubricated as the result of the development of a new product. Common lubricants cannot be used since they would burn off. Colloidal graphite had been tried with varying success, the graphite being suspended in various liquids. The difficulty was with the carrier. Oil, for instance, would burn off, forming undesirable carbon. Smoke and odor were other problems.

The solution was found through the development by Acheson Colloids Corporation of a new form of colloidal graphite, so finely divided that it could be suspended in suitable volatile liquids. The liquid, kerosene in this case,



DRILL CHUCKS

With Hardened Steel Jaws

Capacity 0 to 1/2" fitted with No. 1 or No. 2 Morse taper shank **\$1.25** ea.

No. 1 or No. 2 Morse taper shanks with 1/2" x 24 thread . . . **73c** ea.

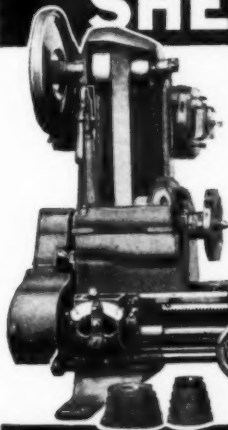
Chucks without shanks . . **52c** ea.

NIELSEN, INC.
LAWTON, MICHIGAN

WHY PAY MORE?

SHELDON

Back Geared Screw Cutting PRECISION LATHES



sturdy full sized, full weight precision lathes at moderate prices. 10", 11" and 12" swing.

- | | |
|---|---|
| 1. Hardened and Ground Spindles | 6. Hand Fitted and Scraped Ways |
| 2. $\frac{3}{4}$ " Collet Capacity | 7. Ball Bearing Spindle Thrust Bearing |
| 3. Plain, Semi-Quick or Quick Change Gears. | 8. Oversize Phosphor Bronze Spindle Bearing |
| 4. Worm Drive Apron | |
| 5. Power Cross Feed | |

No. 1020 BMW
With motor drive attachments, as illustrated, less motor.

\$185

F. O. B.
CHICAGO
motor
extra

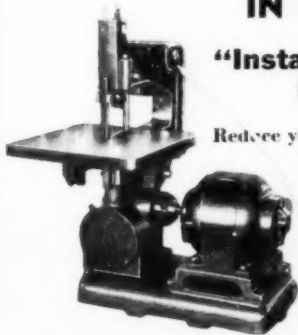
Write for Catalog

SHELDON MACHINE CO., Inc.
3257 S. COTTAGE GROVE AVE.
CHICAGO, ILL., U. S. A.

Machinery Dealers and Distributors:
There are a few territories still open.
Write for proposition.

UNEARTH THOSE "HIDDEN PROFITS" IN THE TOOL ROOM

**"Install an OLIVER of ADRIAN
Die Making Machine"**



Reduce your die costs 50 to 60% over hand methods.

They are fast and accurate on all SAWING,
FILING AND LAPPING OPERATIONS.
THEY SPEED UP THE SLOW OPERATIONS.

PRICED AS LOW AS \$125.00.

NINE SIZES AND TYPES.

Order one today—You will never regret
the decision.

OLIVER INSTRUMENT COMPANY

1408 E. MAUMEE ST.

ADRIAN, MICH.



GET THIS CATALOG

No. 3079

Eye accidents are costly; dangerous. Whatever your problem in eye-protection, we have our special type for you—light and comfortable. Write for catalog and prices.

Sellstrom Mfg. Co., 646 N. Aberdeen St., Chicago

BURR KEYSEATERS



Mill keyways in the run or on the ends of shafting already erected—save money on alteration, erection, and repair work.

Made in 4 sizes, for hand or motor operation.

Write for Bulletins and prices.

JOHN T. BURR & SON
429 Kent Ave., Brooklyn, N. Y.



SAVE 80%
On Hack Saw Blades

Reground each blade 4 times. Price of \$15.75 includes one grinding wheel.

C. H. CARLSON MFG. CO.
13-15 Main St., N. E. Minneapolis, Minn.

“COMET”

Internal Threading and Boring Tools

NOW AVAILABLE tipped with **TUNGSTEN CARBIDE “CUTANIT”**

For holes from $\frac{1}{8}$ " up, 15 different sizes. Easily resharpened. Angles always maintained.



Time Saving . . Increased Production . . Greater Accuracy

COMET TOOLS INC., 39 Union Square
NEW YORK

merely evaporates, leaving a very thin deposit of fine colloidal graphite on the surface. Experience has shown that this film of graphite, although extremely thin, provides lasting and economical lubrication for the difficult-to-reach friction surfaces under high operating temperatures.

Lee Wheel Dresser

The “Knock-Out” abrasive wheel dresser, recently announced by K. O. Lee & Son Co., Aberdeen, S. D., has been designed to fill the gap between the diamond and the conventional star type dresser.



In dressing wheels, the cutting wheel is held at an angle to the grinding wheel, causing the abrasive action. The dresser, the manufacturers claim, can be used equally well mounted in the tool rest or held freehand. No pressure on the wheel is necessary. In fact, the best results are obtained with the device by just touching it to the wheel to be dressed.

$2\frac{1}{2}$ -inch dressers are recommended for wheels up to 6 inches in diameter; 3-inch dressers for wheels up to 12 inches; and 5-inch dressers for larger wheels.

For complete information on this tool, write to the manufacturers, mentioning The BLUE BOOK.

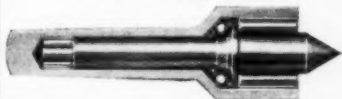
Sheldon "Metalworker" Lathe

The Sheldon Machine Co., Inc., Chicago, manufacturers of Sheldon industrial lathes and Arbor Presses, enter the popular priced lathe field with a new back geared, screw cutting, precision lathe. The new lathe is designed especially for small shops and tool rooms, garages and home craftsmen. It has a 10½" swing, center distances of either 20 inches or 26 inches (bed lengths, 38" or 44" respectively). Among the special "quality machine tool features" claimed for this lathe are:—Hob-cut semi-steel or steel change gears, over size hardened steel spindle, ground all over with 1-1/16" hole thru its entire length, and a heavy, semi-steel base with hand scraped ways—2 "V" ways and 2 flat ways. With the "Metal Worker" is announced a complete line of attachments, accessories and drives for both bench and floor models.

Johnson Multiduty Die Truck

For one-man handling of heavy dies and for use as a portable work-bench with an overhead hoist, the Johnson Multiduty die truck is now being offered by the O. Johnson Co., Brookfield, Ill. The same manufacturer is also offering a variation of the die truck, a simplified portable work-bench, also with an overhead hoist.

Just What You Have Been Wanting—An Economical Live Ball and Roller Bearing Center.



For Lathes, Hand Screw Machines, Grinders, and Mills

1. Simplicity and sturdiness adapt this center to heavy duty with extra long life.
2. Sufficient bearings for radial, thrust, and alignment loads resulting in 50% more radial load than the average live center.
3. Large spindle, small head, and short overhang spells rigidity—result, no chatter.
4. Has special oil seal to retain lubricant and resist foreign matter.

A folder giving prices and complete detail will be mailed to you just for the asking.

A lower first and last cost. Let us prove it by sending you one today for a ten day trial, and if not satisfactory i.e. every way return it.

MOTOR TOOL MFG. CO.
12281 Turner Ave., Detroit, Mich.

Sanding and Polishing Machines



Portable
Electric
Disc and
Oscillating
Types.

Send for circular

THE NEDCO CO.

87 Rumford Ave., Waltham, Mass.



PLENTY OF COOLANT FOR BIG TOUGH JOBS

GUSHER PUMPS eliminate coolant problems, providing coolant exactly when and as needed . . . any fluid, any quantity, for any work. There are no packings . . . no metal-to-metal contacts . . . a type and size for every job.

The Ruthman Machinery Co., 538 E. FRONT ST., CINCINNATI, OHIO



LITTELL

**Air-Blast
Valve
for
Faster
Safer
Production**



PAYS its cost in a few weeks time in — increased production — greater safety — economy of air. Automatically ejects pieces. Operator's hands are never in danger zone. Quickly adjustable air nozzle.

Automatic Roll Feeds—

dial feeds, magazine feeds, hopper feeds, for punch presses. Reels for coiled stock. Send for Circulars.

F. J. Littell Machine Co.
4153 RAVENSWOOD AVE., CHICAGO, ILL.

ARMGLO CO.

Manufacturers of

**Manual and Automatic Resistance
WELDING PRODUCTION EQUIPMENT**
with Magnetic Timing Control
also

DIE FILING & BELT SURFACING MACHINES

Write for complete details
**ARMGLO CO., 3520 W. Pierce Street,
MILWAUKEE, WIS.**

**GROUND FROM THE
SQID after hardening**
H. S. May Be Reground



*Write
for your
free copy of
our beautiful
Catalog No. 12.*

The manufacturer claims that these developments will find many applications in industry. They are well-built and sturdy, easy to operate, standard in size, and practical.

Complete information on this equipment is contained in a new 4-page bulletin, available to BLUE BOOK readers who write to the company.

Dumore Catalog

The 1939 catalog of the precision grinder division of the Dumore Co., Racine, Wis., is now available. In 28 pages, 8½x11 attractively printed in two colors it describes the company's line of precision grinders and grinding equipment. Numerous large operation photos reveal a multitude of uses for Dumore grinders, the different models of which are introduced and thoroughly described, along with their accessories. Readers of The BLUE BOOK may have a copy by addressing the manufacturers.

**Two New Landis Tool
Catalogs**

Two excellent new catalogs have recently been issued by the Landis Tool Co., Waynesboro, Pa. One catalog, No. J-538, describes the company's 14-inch Type C hydraulic universal grinders; the other, D-38, covers the details of the 6-inch Type C plain hydraulic grinders.

Both are 12-page booklets, containing many illustrations showing typical set-up views of these machines. The manufacturer will send either of the catalogs upon request.

**SEVERANCE Midget Milling Cutters
Save 75% On Many Jobs**

One tool engineer said, "We are just waking up; we've half a million uses for your tools."

Why put up with grinding dust, hand filing, obsolete rotary filing, etc.? Let Severance Engineers survey your jobs. Our cutters have a MONEY BACK Guarantee.

Another engineer writes, "I could not get a cutter to stand up until your cutter came out. (They ARE real.)"

Severance Tool Manufacturing Co.
1510 Genesee Saginaw, Mich.

Atlas Offers Complete New Catalog

The Atlas Press Co. general catalog for 1939, released in January, presents the most complete information ever available on Atlas lathes, shapers, drill presses, arbor presses, and shop equipment. The book is attractively made up and profusely illustrated. Twenty-four of its 72 pages are devoted to the new 10-inch Atlas lathes with power cross feed. Copies are available from Atlas Press Company, Dept. 7, Kalamazoo, Michigan—ask for Catalog No. 39.



"Kennametal" Tools

A new, reliable, hard carbide alloy for machining tough metals such as steel, heat treated up to 500 Brinell, which combines roughing and finishing in one operation, is now being supplied under the trade name of "Kennametal" by the McKenna Metals Company, 135 Lloyd Ave., Latrobe, Pa. The basic ingredient is tungsten-titanium carbide (WTiC2) and the new alloy may also be used in machining monel metal, malleable iron, cast iron brass, bronze, aluminum, etc.

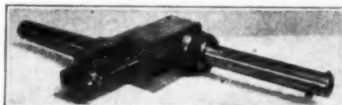
Kennametal is available in three standard styles of blanks from which tools may be tipped by the user, or it may be purchased in other than

standard blanks. The manufacturer also offers an assortment of 18 styles of Kennametal tipped tools for operations such as reaming, boring, tapping, milling, gaging, etc. The illustration shows Style No. 11 tool, tipped with Kennametal, and the unretouched inserts show the smooth finish of Kennametal form-tooled bar stock (magnified three times) as compared with surface machined with high speed steel, or tungsten carbide.

Kennametal is said to permit two to six times greater cutting speeds than those of high speed steel and 10 to 50 times as many pieces per grind of tool. It is harder than the hardest tool steel. The manufacturer has prepared a new, descriptive booklet and will be glad to furnish complete information on request. We'll appreciate mention of The BLUE BOOK when you write.

Verson Works Manager

Mr. Ernest Niederer, identified with the power press industry for many years, has been appointed Works Manager of the Verson Allsteel Press Co.



MODERNIZE present equipment with a RUSSELL BORING BAR. Bores 9/16" to 12" dia. with boring axis parallel to shank axis. One compact tool, with micrometer adjustment.

RUSSELL BORING BAR CO.
MIDDLETOWN, OHIO



**Machinists Tool
Grinding Co.**

2834 W. Lake Street
CHICAGO, ILLINOIS

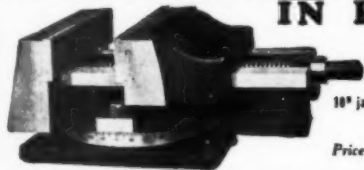
WHY DISCARD DULL POWER HACK SAW BLADES?

Your dull blades can be sharpened over and over again at the low cost of 2½¢ per inch (12 blades or more).

Power Hack Saws Are Expensive to Scrap

Retut saws prove not only a money saver but a better cutting saw.

SUPERIOR QUALITY AND WORKMANSHIP IN PLUNKET VISES



The Shaper Vise has graduated base and tongue in center to fit slot in table, and has holes for bolting down. In ordering this vise give size of slots in Shaper Table, also distance from center to center of slots.

10" jaws, $2\frac{3}{4}$ " deep, opens $8\frac{1}{2}$ ". Weight 125 lbs. \$46.80

Our complete line includes Vises for Drill Presses, Milling Machines, Shapers and Grinders.

Prices are net, f. o. b. Chicago. Write for illustrated folder today. Dealers wanted in unoccupied territory.

SQUARE BASE SHAPER VISE

J. E. Plunket Machine Co. 1023 W. Lake Street
Chicago, Illinois

— GEARS —

**Spur — Helical — Worm —
Bevel — Miter, Etc.**

We do broaching and all kinds of grinding.

We specialize in grinding hardened steel bushings, cam rollers, etc.

Prompt service and quality has retained a large list of customers for 25 years.

TAYLOR MACHINE CO.

1919 E. 61st St., Cleveland, Ohio

Oslund Universal Indicator

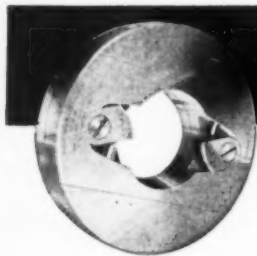
Built to provide a convenient, easy-to-read indicator for general use, a new indicator is announced by the Oslund Tool & Die Co., Hartford, Conn.

Among the advantages claimed by the manufacturer for the new instrument are its versatility and its shock-proof



construction. It is said that the design of the scale makes it ideal for jig boring and milling machine operations. The indicator will not be damaged by pushing the contact point beyond the travel of the pointer.

For further information, please address the manufacturers, mentioning The BLUE BOOK.

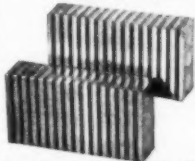


for
your
lathes

SENECA FALLS
Automatic
WORK DRIVER

Self Centering . . . Quick Acting . . . No Slip. Attaches to any chuck plate or spindle. Provides a slip-proof, balanced drive reducing chatter. Handles rough forgings or turned pieces—straight or taper. Eliminates dogging time. Reduces tool breakage. Write for details and size range.

SENECA FALLS MACHINE CO., 314 Falls St., Seneca Falls, N. Y.

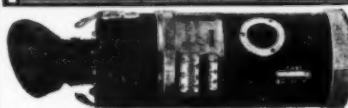
McMAHON MAGNETIC PARALLELS
 will give you perfect satisfaction


Made in two sizes

M-10 1"x2"x4"
 price \$5.00

M-11 1"x3"x6"
 price \$9.00

FRANK McMAHON CO., 142 S. JUNE ST.,
 DAYTON, OHIO

PYRO THE SIMPLIFIED OPTICAL PYROMETER


Unique construction enables operators to rapidly determine temperature even on minute spots, fast moving objects or the smallest streams; no correction charts, no accessories, no upkeep.

THE PYROMETER INSTRUMENT CO.
 102-105 Lafayette St., New York, N. Y.

BORGESON

 Universal
 Joints


These dependable, efficient Universal Joints are a ready solution to angle drive problems. Used in hundreds of manufacturing plants on multiple spindle drills and relieving attachments; milling machines; and for driving boring bars held in rigid bearings, Hoist-Trucks—Take Offs On Oil Trucks requiring angle drives.

Send us your blue prints and we will gladly submit estimates—without obligation.

The Borgeson Mfg. Co., Inc.
 Torrington, Conn.

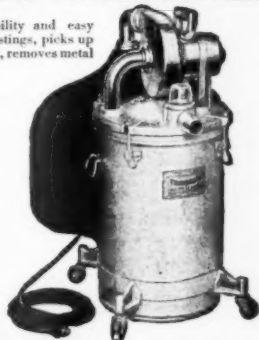
Just a Few of The Hundreds of Money-Saving Uses for Breuer Ball Bearing TORNADO INDUSTRIAL VACUUM CLEANER
VACUUMS Tremendous power combined with light weight for portability and easy handling. Cleans walls, floors, shelves, overhead pipes, boiler tubes. Cleans castings, picks up water, reclaims valuable waste materials, cleans rugs or upholstery, truck interiors, removes metal scraps and filings. Use it from boiler-room to pent-house. Does most of the work large stationary machines will do at a fraction of the cost. Applicable for 95% of all plant cleaning requirements.

BLOWS Power unit can be quickly removed and with attachments converted into powerful hand blower for cleaning motors, machinery and parts, and hard-to-reach places.

SPRAYS Power unit also easily converted into sprayer for volume spraying of insecticides.

Three machines for the price of one! Hundreds of uses for each machine! No industrial plant can afford to be without this great time and labor-saver.

Write for free trial offer!

BREUER ELECTRIC MFG. CO.
 5108 No. Ravenswood Avenue Chicago, Ill.

 TAKE THE
 DUST OUT
 OF
 IN DUSTY

 with **BREUER'S BALL BEARING TORNADO**
 PORTABLE INDUSTRIAL VACUUM CLEANER

FREE TRIAL!

We'll gladly send you a Tornado for free trial to prove our claims. No obligation. For prices and details of free trial offer, write.

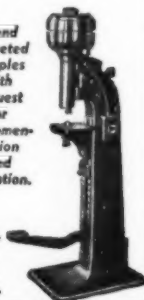
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RIVETERS

include both Noiseless Spinning and Vibrating Hammer types of machines —also Vertical and Horizontal Multiple Spindle Spinning Machines.



Send
unriveted
samples
with
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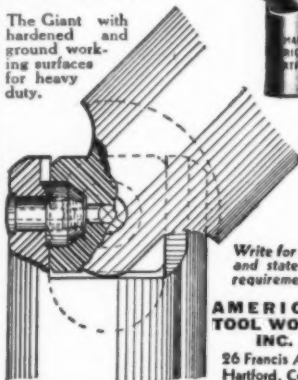
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& MACHINE CO.**

C. E. Station
BRIDGEPORT, CONN.

VANDERBEEK
UNIVERSAL
JOINTS

The Baby Giant for instrument and control work.

The Giant with hardened and ground working surfaces for heavy duty.



Write for prices
and state your
requirements

**AMERICAN
TOOL WORKS
INC.**

26 Francis Ave.
Hartford, Conn.

Buyers' Directory

Abrasive Cut-off Machines

Challenge Mch. Co., Grand Haven, Mich.
Tannewitz Works, Grand Rapids, Mich.

Adapters, Adjustable

Glenzer Company, J. C., Detroit, Mich.

Air Filtering Machines

Lincoln Electric Co., Cleveland, Ohio

Angle Plates

McMahon Co., Frank, Dayton, Ohio

Angle Iron Cutting & Notching Machines

Ward Machinery Co., 564 W. Washington, Chicago, Ill.

Arbors

Kearney & Trecker Corp., Milwaukee, Wis.

Balancing Ways

Anderson Bros. Mfg. Co., Rockford, Ill.
Sundstrand Machine Tool Co., Rockford, Ill.

Baling Presses

Galland-Henning Mfg. Co., Milwaukee, Wis.

Band Saw Machines, for Metal

Armstrong-Blum Mfg. Co., 5741 Bloomington Ave., Chicago, Ill.

Delta Mfg. Co., Milwaukee, Wis.

Grob Bros., Grafton, Wis.

Oliver Machinery Co., Grand Rapids, Mich.

Tannewitz Works, Grand Rapids, Mich.

Wells Mfg. Co., Three Rivers, Mich.

Bar Cutters

Buffalo Forge Company, Buffalo, N. Y.

Baths, Annealing

Holden Co., A. P., New Haven, Conn.

Baths, Blackening Steel

Holden Co., A. P., New Haven, Conn.

Baths, Tool & Die Hardening

Holden Co., A. P., New Haven, Conn.

Belt Lacing

Armstrong-Bray & Co., 315 N. Loomis, Chicago

Belt Sanders

Skilsaw, Inc., 3304 Elston Ave., Chicago, Ill.

Belts, V-Type

Delta Mfg. Co., Milwaukee, Wis.

Bench Legs, Steel

Standard Pressed Steel Co., Jenkintown, Pa.

Bending Machines, Hand and Power

Armstrong-Blum Mfg. Co., 5741 Bloomington Ave., Chicago, Ill.

Buffalo Forge Company, Buffalo, N. Y.

Lewthwaite Machine Co., 311 E. 47th St., New York, N. Y.

Bending Rolls

Buffalo Forge Co., Buffalo, N. Y.

Marshalltown Mfg. Co., Marshalltown, Ia.

Ward Machinery Co., 564 W. Washington, Chicago, Ill.

Bins

Interior Steel Equipment Co., Cleveland, O.

Stackbin Corp., Providence, R. I.

Blades, Hack Saw

Racine Tool & Mch. Co., Racine, Wis.

Blower Wheels (Sirocco Type)

Janette Mfg. Co., 554 W. Monroe St., Chicago

Blowers, Portable Electric

Breuer Electric Mfg. Co., 5108 N. Ravenswood Ave., Chicago

Buffalo Forge Company, Buffalo, N. Y.

Clements Mfg. Co., 6650 Naragansett, Chicago

General Blower Co., 401 N. Peoria St., Chicago

Skilsaw, Inc., 3304 Elston Ave., Chicago, Ill.

Bolts and Nuts

Triplex Screw Co., Cleveland, Ohio

Books, Engineering and Technical

Starrett Co., L. S., Athol, Mass.

Boring Bars

F. A. Maxwell Co., Bedford, Ohio

Boring Heads

Flynn Manufacturing Co., Detroit, Mich.

Rickert-Shafer Co., Erie, Penn.

Buyers' Directory

Boring Machines

R & L Tools, Philadelphia, Pa.
Brakes, Hand and Power
 Dreis & Krump Mfg. Co., 7440 So. Loomis
 Blvd., Chicago, Ill.
 Verson Alhsteel Press Co., 9303 S. Kenwood Ave.,
 Chicago, Ill.
 Ward Machinery Co., 504 W. Washington, Chi-
 cago, Ill.

Brazers, Electric

Grob Brothers, Grafton, Wis.
 Oliver Machinery Co., Grand Rapids, Mich.

Broaches, Adjustable Clamp

East Shore Machine Products Co., Cleveland, O.

Broaches, Splined and Square

Taylor Machine Co., Cleveland, Ohio

Buffers, Bench

Hammond Machinery Builders, Kalamazoo, Mich.
 Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
 Vonnegut Moulder Corp., Indianapolis, Ind.

Buffers, Pedestal

Vonnegut Moulder Corp., Indianapolis, Ind.

Bulldozers

Beatty Mch. & Mfg. Co., Hammond, Ind.

Bushings, Jig

Acme Industrial Co., 210 N. Laflin St., Chicago

Bushings, Steel

Acme Industrial Co., 210 N. Laflin St., Chicago
 Baumbach Mfg. Co., E. A., 1812 So. Kilbourne
 Ave., Chicago, Ill.

Universal Engineering Co., Frankenmuth, Mich.

Calipers

Comet Tools, Inc., 39 Union Square, New York

Scherr Co., George, 122 Lafayette St., N. York

Cams, Alloy Steel

Modern Collet & Machine Co., Ecorse, Mich.

Cap Screws

Triplex Screw Co., Cleveland, Ohio

Centering Machines

Cullman Wheel Co., 1359 Altgeld St., Chicago

Sundstrand Machine Tool Co., Rockford, Ill.

Center Points

Ford Motor Co., Johansson Div., Dearborn, Mich.

Centers, Lathe

Modern Machine Corp., Brooklyn, N. Y.

Motor Tool Mfg. Co., Detroit, Mich.

Nielsen, Inc., Lawton, Mich.

Chains, Silent and Roller

Chicago Gear Works, 709 W. Jackson Blvd.,
 Chicago, Ill.

Cullman Wheel Co., 1359 Altgeld St., Chicago

Chamfering Machines, Automatic

Grant Mfg. & Machine Co., Bridgeport, Conn.

Chucking Fingers

Modern Collet & Machine Co., Ecorse, Mich.

Morrison Machine Products Div., Elmira, N. Y.

Chucks, Air

Logansport Machine, Inc., Logansport, Ind.

Tomkins-Johnson Co., Jackson, Mich.

Chucks, Automatic

Procnier Safety Chuck Co., 14 S. Clinton St.,
 Chicago, Ill.

Chucks, Collet

Hardinge Brothers, Inc., Elmira, N. Y.

Procnier Safety Chuck Co., 14 S. Clinton St.,
 Chicago, Ill.

Universal Eng. Co., Frankenmuth, Mich.

Chucks, Drill and Tap

Errington Mech. Labor., Staten Island, N. Y.

Etico Tool Co., 594 Johnson Ave., Brooklyn, N. Y.

Hartford Special Mach'y Co., Hartford, Conn.

Nielsen, Inc., Lawton, Mich.

Procnier Safety Chuck Co., 14 S. Clinton St.,
 Chicago, Ill.

Sampson Tool Co., 101 Walker St., New York

Scully-Jones & Co., 1905 S. Rockwell St., Chi-
 cago, Ill.



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Buyers' Directory

Chucks, Lathe

L-W Chuck Co., Toledo, Ohio
Sampson Tool Co., 101 Walker St., New York

Chucks, Magnetic

Brown & Sharpe Mfg. Co., Providence, R. I.

Chucks, Positive Drive

Apex Mch. & Tool Co., Dayton, Ohio

Chucks, Quick Change

Apex Mch. & Tool Co., Dayton, Ohio
Glenzer Company, J. C., Detroit, Mich.
Jarvis Co., Chas. L., Middletown, Conn.
Proconier Safety Chuck Co., 14 So. Clinton St., Chicago, Ill.

Chucks, Safety Tapping

Apex Mch. & Tool Co., Dayton, Ohio

Chucks, Vertical Float

Apex Mch. & Tool Co., Dayton, Ohio

Clamps, Toggle, (Univ. Action)

Knu-Vise Products Co., Detroit, Mich.

Clutches, Friction

Carroll Mfg. Co., L. W., Cincinnati, Ohio.

Conway Clutch Co., Cincinnati, Ohio

Coil Winding Equipment

Ideal Commutator Dresser Co., Sycamore, Ill.

Collets and Feed Fingers

Modern Collet & Machine Co., Ecorse, Mich.
Morrison Machine Products Div., Elmira, N. Y.

Collets for all Lathes and Millers

Hardinge Brothers, Inc., Elmira, N. Y.
Modern Collet & Machine Co., Ecorse, Mich.
Sutton Tool Co., Detroit, Mich.

Collets, Quick Change

Jarvis Co., Chas. L., Middletown, Conn.

Collet Tubes

Modern Collet & Machine Co., Ecorse, Mich.
Sutton Tool Co., Detroit, Mich.

Comparators

Federal Products Corp., Providence, R. I.

Compounds, Abrasive

Timesaver Prod. Co., 31 S. Desplaines, Chicago

Compounds, Case Hardening

Holden Co., A. F., New Haven, Conn.

Compounds, Grinding

Timesaver Prod. Co., 31 S. Desplaines, Chicago

Compounds, Lapping

Timesaver Prod. Co., 31 S. Desplaines, Chicago

Contract Work Wanted

Burke Machine Tool Co., Conneaut, Ohio

Coping Machines

Bentley Mch. & Mfg. Co., Hammond, Ind.

Counterbores

Glenzer Company, J. C., Detroit, Mich.
Scully-Jones & Co., 1905 S. Rockwell St., Chicago, Ill.

Counters

Durant Mfg. Co., Milwaukee, Wis.

Countersinks

Glenzer Company, J. C., Detroit, Mich.
Severance Tool Mfg. Co., Saginaw, Mich.

Couplings, Belt

Armstrong-Bray & Co., 315 N. Loomis, Chicago

Couplings, Compression Shaft

W. H. Nicholson & Co., Wilkes-Barre, Pa.

Couplings, Flexible

Chicago Die Casting Mfg. Co., 2502 W. Monroe, Chicago.

Congress Tool & Die Co., Detroit, Mich.

Lovejoy Flex. Coupling Co., 5026 Lake, Chicago

W. H. Nicholson & Co., Wilkes-Barre, Pa.

Couplings, Friction Clutch

Conway Clutch Co., Cincinnati, Ohio

Couplings, Shaft

W. H. Nicholson & Co., Wilkes-Barre, Pa.

Cranes

Shaw Box Crane & Hoist Div., Muskegon, Mich.

Cut-Off Machines

Modern Machine Tool Co., Jackson, Mich.

Buyers' Directory

Cut-off Saws

Oliver Machinery Co., Grand Rapids, Mich.
Tannewitz Works, Grand Rapids, Mich.

Cutter Grinders

Gorton Machine Co., Geo., Racine, Wis.
Oliver Instrument Co., Adrian, Mich.

Cutters

Putnam Tool Co., Detroit, Mich.
Tomkins-Johnson Co., Jackson, Mich.

Cutters, Ball Socket

Severance Tool Mfg. Co., Saginaw, Mich.

Cutters, Midget Milling

Severance Tool Mfg. Co., Saginaw, Mich.

Cutters, Milling

Brown & Sharpe Mfg. Co., Providence, R. I.
Machinists Tool Grinding Co., 2834 W. Lake St., Chicago, Ill.

Modern Machine Tool Co., Jackson, Mich.

Item Tool Co., Detroit, Mich.

Scully-Jones & Co., 1905 S. Rockwell St., Chicago, Ill.

Wiley's Carbide Tool Co., Detroit, Mich.

Cutters, Gear

Michigan Tool Co., Detroit, Mich.

Cutters, Taper Reaming

Severance Tool Mfg. Co., Saginaw, Mich.

Cutters, Tube Burring

Severance Tool Mfg. Co., Saginaw, Mich.

Cutters, Woodruff

Glenzer Company, J. C., Detroit, Mich.

Cylinders, Air

Hanna Engineering Works, 1763 Elston, Chicago
Logansport Machine, Inc., Logansport, Ind.
Tomkins-Johnson Co., Jackson, Mich.

Demagnetizers

Alofs Manufacturing Company, Grand Rapids, Mich.

Electro-Matic Products Co., 4820 Deming Place, Chicago, Ill.

Luma Electric Equipment Co., Toledo, Ohio

L-W Chuck Co., Toledo, Ohio

Printz Electric Co., Detroit, Mich.

Victor Machinery Co., 130 S. Clinton St., Chicago, Ill.

Die Casting Machines

Harvill, H. L., Inc., Los Angeles, Cal.

Die Castings

Chicago Die Casting Mfg. Co., 2502 W. Monroe, Chicago.

Congress Tool & Die Co., Detroit, Mich.

Die Cushions

Dayton Rogers Mfg. Co., Minneapolis, Minn.

Die Duplicating Machines

Gorton Machine Co., Geo., Racine, Wis.

Die Filers

Continental Machine Specialties, Minneapolis

Grob Brothers, Grafton, Wis.

Jarvis Co., Charles L., Middletown, Conn.

Oliver Instrument Co., Adrian, Mich.

Postal Filing Mch. Co., Minneapolis, Minn.

Die Heads, Self-opening

Rickert-Shafer Co., Erie, Penna.

Die Making Machines

Armigo Co., Milwaukee, Wis.

Continental Machine Specialties, Minneapolis

Grob Brothers, Grafton, Wis.

Harvey Mfg. Co., 101 Grand St., New York

Oliver Instrument Co., Adrian, Mich.

Pratt & Whitney, Hartford, Conn.

Die Makers' Supplies

Cerro de Pasco Copper Corp., 44 Wall St., New York, N. Y.

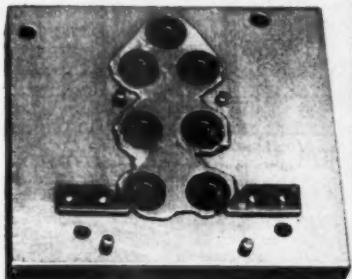
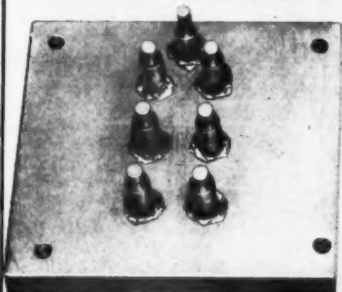
Dayton Rogers Mfg. Co., Minneapolis, Minn.

Hoover Tool Company, Anderson, Ind.

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Baumbach Mfg. Co., E. A., 1812 So. Kilbourne Ave., Chicago, Ill.

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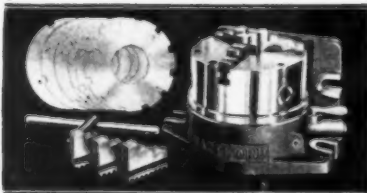
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American Tool Works, Inc., Hartford, Conn.
Hamilton Tool Company, Hamilton, Ohio
- Dies, Hole Punching**
Strippit Corp., Buffalo, N. Y.
- Dies, Notching**
Strippit Corp., Buffalo, N. Y.
- Dividing Heads**
Wm. Carroll & Son, Norwood, Cincinnati, O.
L-W Chuck Co., Toledo, Ohio
- Dowel Pins, Steel**
Acme Industrial Co., 210 N. Laflin St., Chicago
Baumbach Mfg. Co., E. A., 1812 So. Kilbourne Ave., Chicago, Ill.
- Drawing Instruments**
Wade Instrument Co., Cleveland, Ohio.
- Dressers, Contour Grinding**
Brickner - Kropf Mch. Co., Muskegon Heights, Mich.
- Dressers, Diamond Point**
Rodney Welch Industries, Detroit, Mich.
- Dressers, Emery Wheel**
Carboly Co., Detroit, Mich.
- Dressers, Grinding Wheel**
Desmond-Stephan Mfg. Co., Urbana, Ohio
- Dressers, Precision Wheel**
Rodney Welch Industries, Detroit, Mich.
- Dressing Tools**
Willey's Carbide Tool Co., Detroit, Mich.
- Drill Bushings**
Acme Industrial Co., 210 N. Laflin St., Chicago
Universal Eng. Co., Frankmunth, Mich.
- Drills, Core**
Glenzer Company, J. C., Detroit, Mich.
- Drills, Electric**
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
Skilaw, Inc., 3304 Elston Ave., Chicago, Ill.
Stanley Electric Tool Div., New Britain, Conn.
- Drill Grinders**
Black Diamond Saw & Machine Works, Inc., Satick, Mass.
Gallmeyer & Livingston Co., Gr. Rapids, Mich.
Oliver Instrument Co., Adrian, Mich.
- Drill Presses**
Gibson Engineering Works, Janesville, Wis.
Walker-Turner Company, Plainfield, N. J.
- Drill Press Heads**
Walker-Turner Company, Plainfield, N. J.
- Drilling Attachments, High Speed**
Dufrae Tools Company, Syracuse, N. Y.
- Drilling Machines, Bench**
Ayer Manufacturing Co., F. H., Chicago Heights, Ill.
- Atlas Press Co., Kalamazoo, Mich.**
Buffalo Forge Company, Buffalo, N. Y.
Burke Machine Tool Co., Conneaut, Ohio
Delta Mfg. Co., Milwaukee, Wis.
- Drilling Machines, Multiple Spindle**
Buffalo Forge Co., Buffalo, N. Y.
- Drilling Machines, Portable Electric**
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
Skilaw, Inc., 3304 Elston Ave., Chicago, Ill.
Strand Co., N. A., 5001 N. Wolcott St., Chicago
- Drilling Machines, Post**
Buffalo Forge Co., Buffalo, N. Y.
- Drilling Machines, Sensitive**
Atlas Press Co., Kalamazoo, Mich.
Buffalo Forge Company, Buffalo, N. Y.
Burke Machine Tool Co., Conneaut, Ohio
Hamilton Tool Co., Hamilton, Ohio
- Drilling Machines, Vertical**
Atlas Press Co., Kalamazoo, Mich.
Buffalo Forge Company, Buffalo, N. Y.

Buyers' Directory

Drilling Machines, Wall Type

Ayer Manufacturing Co., F. H., Chicago Heights, Ill.

Drives, Lathe

Berkeley Engineering Co., Cleveland, Ohio
Cullman Wheel Co., 1359 Altgeld St., Chicago
Hardinge Brothers, Inc., Elmira, N. Y.
Powermaster, 25 E. Fourth St., New York, N. Y.
Westlof Tool & Mfg. Co., Detroit, Mich.

Drives, Machine Tool

Westlof Tool & Mfg. Co., Detroit, Mich.

Drives, Shaper

Westlof Tool & Mfg. Co., Detroit, Mich.

Drives, Variable Speed

Columbia Vari-Speed Company, Wheaton, Ill.
Powermaster, 25 E. 4th St., New York, N. Y.

Elevating Tables

Hamilton Tool Company, Hamilton, Ohio
Johnson Co., O., Brookfield, Ill.

Emery Wheel Dressers and Cutters

Western Tool & Mfg. Co., Springfield, Ohio

End Mills

Glenzer Company, J. C., Detroit, Mich.
Renu Tool Co., Detroit, Mich.
Putnam Tool Co., Detroit, Mich.
Willey's Carbide Tool Co., Detroit, Mich.

Engraving Machines

Gorton Machine Co., Geo., Racine, Wis.

Engravers Tools

Hoover Tool Co., Anderson, Ind.

Etching Machines, Electric

Brewster Co., Inc., 50 Church St., New York, N. Y.

Ideal Commutator Dresser Co., Sycamore, Ill.
Luna Electric Equipment Co., Toledo, Ohio
Printz Electric Co., Detroit, Mich.

Exhaust Blowers

Buffalo Forge Company, Buffalo, N. Y.

Experimental Work

American Tool Works, Inc., Hartford, Conn.

Extractors, Tap

Walton Co., Hartford, Conn.

Facers, Spot

Glenzer Company, J. C., Detroit, Mich.

Feed Fingers for Auto. Screw Machines

Modern Collet & Machine Co., Ecorse, Mich.
Morrison Machine Products Div., Elmira, N. Y.
Sutton Tool Co., Detroit, Mich.

Files

Oliver Instrument Co., Adrian, Mich.

Files, Rotary

Ford Mfg. Co., M. A., Davenport, Iowa
Grobet File Corp. of America, 3 Park Place, New York, N. Y.

Hamilton Tool Co., Hamilton, Ohio
Jarvis Co., Charles L., Middletown, Conn.
Pratt & Whitney Div., Hartford, Conn.
Severance Tool Mfg. Co., Saginaw, Mich.

Filing Machines

Continental Machine Spectatiles, Minneapolis
Groh Brothers, Grafton, Wis.
Harvey Mfg. Co., 101 Grand St., New York
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
Oliver Instrument Co., Adrian, Mich.

Filing Room Equipment

Wardwell Manufacturing Co., Cleveland, Ohio

Flangers, Hand and Power

Ward Machinery Co., 504 W. Washington, Chicago, Ill.

Flexible Couplings

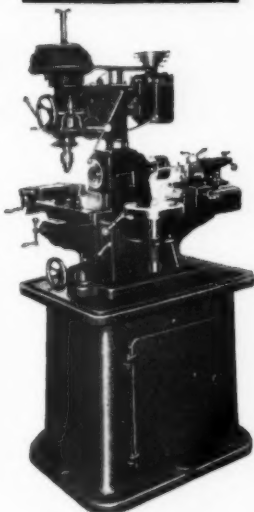
Lovejoy Flexible Coupling Co., 5026 Lake, Chgo.

Flexible Shaft Couplings

Lovejoy Flexible Coupling Co., 5026 Lake, Chgo.
W. H. Nicholson & Co., Wilkes-Barre, Pa.

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- Flexible Shafts and Accessories**
 American Rotary Tools Co., 44 Whitehall St., New York, N. Y.
 Haskins Co., R. G., 623 S. California, Chicago.
 Jarvis Co., Charles L., Middletown, Conn.
 Mall Tool Co., 7742 S. Chicago Ave., Chicago
 Strand & Co., 5001 N. Wolcott, Chicago
 Walker-Turner Company, Plainfield, N. J.
 Wyzenbeck & Staff, Inc., 838 W. Hubbard, Chgo.
- Flexible Shaft Machinery**
 Haskins Co., R. G., 623 S. California, Chicago.
 Jarvis Co., Charles L., Middletown, Conn.
 Mall Tool Co., 7742 S. Chicago Ave., Chicago
 Pratt & Whitney, Hartford, Conn.
 Strand & Co., 5001 N. Wolcott, Chicago
 Wyzenbeck & Staff, Inc., 838 W. Hubbard, Chgo.
- Floating Holders**
 Glenzer Company, J. C., Detroit, Mich.
- Floating Holders, Parallel Float**
 Apex Mch. & Tool Co., Dayton, Ohio
- Floating Holders, Parallel & Rad.**
 Apex Mch. & Tool Co., Dayton, Ohio
- Flue Lathes**
 Marshalltown Mfg. Co., Marshalltown, Ia.
- Flue Welders**
 Marshalltown Mfg. Co., Marshalltown, Ia.
- Forming Tools**
 Michigan Tool Co., Detroit, Mich.
 Morrison Machine Products Div., Elmira, N. Y.
- Furnaces, Atmospheric Pot**
 Holden Co., A. F., New Haven, Conn.
- Furnaces, Industrial**
 Strong, Carlsie & Hammond Co., Cleveland, O.
- Furniture, Machine Shop**
 Standard Pressed Steel Co., Jenkintown, Pa.
 Western Tool & Mfg. Co., Springfield, Ohio
- Gages**
 Chicago Dial Indicator Co., 180 N. Wacker, Chgo.
 Federal Products Corp., Providence, R. I.
 Ford Motor Co., Johanson Div., Dearborn, Mich.
 Willey's Carbide Tool Co., Detroit, Mich.
- Gages, Pin, Plug, Ring and Snap**
 American Tool Works, Inc., Hartford, Conn.
- Gages, Pressure**
 Standard Gage Co., Poughkeepsie, N. Y.
- Gages, Special**
 Marshalltown Mfg. Co., Marshalltown, Ia.
- Gages, Taper**
 Federal Products Corp., Providence, R. I.
 Ford Motor Co., Johanson Div., Dearborn, Mich.
 Standard Gage Co., Poughkeepsie, N. Y.
 Starrett Co., L. S., Athol, Mass.
- Gasoline Electric Light Plants**
 Hartford Special Machinery Co., Hartford, Conn.
- Gears**
 Janet Mfg. Co., 550 W. Monroe St., Chicago
- Gears, Gear & Mch. Co.**
 Abert Gear & Mch. Co., 4832 W. 16th St., Chgo.
 Atlantic Gear Works, 200 Lafayette St., New York, N. Y.
 Chicago Gear Works, 700 W. Jackson Blvd., Chicago, Ill.
 Taylor Machine Co., Cleveland, Ohio
- Gear Pumps**
 East Shore Machine Products Company, Cleveland, Ohio
- Generators**
 Janet Mfg. Co., 552 W. Monroe St., Chicago
- Generators, Motor**
 Lincoln Electric Co., Cleveland, Ohio
- Goggles**
 Sellstrom Mfg. Co., 646 N. Aberdeen St., Chicago, Ill.
- Grinder Live Centers**
 Motor Tool Mfg. Co., Detroit, Mich.
- Grinders, Air**
 M-B Products, Detroit, Mich.
- Grinders, Bench**
 Baldor Electric Co., St. Louis, Mo.
 Hammond Machinery Builders, Kalamazoo, Mich.
- Grinders, Flexible Shaft**
 Haskins Co., R. G., 623 S. California, Chicago.
 Jarvis Co., Charles L., Middletown, Conn.
 Mall Tool Co., 7742 S. Chicago Ave., Chicago
 Oliver Machinery Co., Grand Rapids, Mich.
 Wyzenbeck & Staff, Inc., 838 W. Hubbard, Chgo.
- Grinders, Hand**
 Chicago Wheel & Mfg. Co., 1101 W. Monroe St., Chicago, Ill.
 Dumore Co., Racine, Wis.
 Duro Metal Products Co., 2651 N. Kildare Ave., Chicago, Ill.
 Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
 M-B Products Co., Detroit, Mich.
 Skilsaw, Inc., 3304 Elston Ave., Chicago, Ill.
- Grinders, Heavy Duty**
 Vonnegut Moulder Corp., Indianapolis, Ind.
- Grinders, High Speed**
 Bridgeport Machines, Inc., Bridgeport, Conn.
 Chicago Wheel & Mfg. Co., 1101 W. Monroe St., Chicago, Ill.
- Grinders, Internal**
 F. A. Maxwell Co., Bedford, Ohio
- Grinders, Pedestal Electric**
 Baldor Electric Co., St. Louis, Mo.
 Hammond Machinery Builders, Kalamazoo, Mich.
- Grinders, Precision**
 Dumore Co., Racine, Wis.
- Grinders, Swing Frame**
 Vonnegut Moulder Corp., Indianapolis, Ind.
- Grinders, Valve**
 F. A. Maxwell Co., Bedford, Ohio
- Grinding Attachments, Drill**
 Atlas Press Co., Kalamazoo, Mich.
 Carlson Mfg. Co., C. H., Minneapolis, Minn.
 Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
 Oliver Instrument Co., Adrian, Mich.
- Grinding, Centrifugal (Contract)**
 Helm Company, Fairfield, Conn.
 Machinists Tool Grinding Co., 2834 W. Lake St., Chicago, Ill.
- Grinding Machines, Belt**
 Armiglo Co., Milwaukee, Wis.
 Walls Sales Corp., 96 Warren St., New York
- Grinding Machines, Cutter, Reamer and Tool**
 Brown & Sharpe Mfg. Co., Providence, R. I.
 Gallmeyer & Livingston Co., Grand Rapids, Mich.
- Hammond Machinery Builders**
 National Machine Tool Co., Racine, Wis.
 Oliver Instrument Co., Adrian, Mich.
 Prosser & Son, 129 Wall St., New York, N. Y.
- Grinding Machines, Internal**
 National Machine Tool Co., Racine, Wis.
- Grinding Machines, Portable Electric**
 Chicago Wheel & Mfg. Co., 1101 W. Monroe St., Chicago, Ill.
 Duro Metal Products Co., 2651 N. Kildare Ave., Chicago, Ill.
- Grinding Machines, Surface**
 Gallmeyer & Livingston Co., Grand Rapids, Mich.

Buyers' Directory

Grinding Machines, Tap

Gallmeyer & Livingston Co., Grand Rapids, Mich.
Oliver Instrument Co., Adrian, Mich.

Grinding Machines, Tool

Prosser & Son, 120 Wall St., New York, N. Y.

Grinding Service

Machinists Tool Grinding Co., 2834 W. Lake St., Chicago, Ill.

Grinding Wheels

Chicago Wheel & Mfg. Co., 1101 W. Monroe St., Chicago, Ill.
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.

Hack Saw Blades

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.
Starrett Co., L. S., Athol, Mass.

Hack Saw Machines

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.
L-W Chuck Co., Toledo, Ohio
Racine Tool & Mch. Co., Racine, Wis.
Wells Mfg. Corp., Three Rivers, Mich.

Hammers, Forge

Murray Mfg. Co., D. J., Wausau, Wis.

Hammers, Portable Electric

Stanley Electric Tool Div., New Britain, Conn.

Hand Saws, Portable Electric

Skillsaw, Inc., 3304 Elston Ave., Chicago, Ill.

Hand Screw Machine Live Centers

Motor Tool Mfg. Co., Detroit, Mich.

Hand Screw Machines, Precision

Hardinge Brothers, Inc., Elmira, N. Y.

Heads, Boring

Flynn Manufacturing Co., Detroit, Mich.

Hoists, Electric

Shaw Box Crane & Hoist Div., Muskegon, Mich.

Hole Cutters

Wyzenbeek & Staff, Inc., 838 W. Hubbard, Chgo.

Index Centers

Brown & Sharpe Mfg. Co., Providence, R. I.
Wm. Carroll & Son, Norwood, Cincinnati, Ohio
L-W Chuck Co., Toledo, Ohio

Indicator Holders

Chicago Dial Indicator Co., 180 N. Wacker, Chgo.

Indicators, Dial

Chicago Dial Indicator Co., 180 N. Wacker, Chgo.
Federal Products Corp., Providence, R. I.
Standard Gage Co., Inc., Poughkeepsie, N. Y.
Starrett Co., L. S., Athol, Mass.

Indicators, Speed

Starrett Co., L. S., Athol, Mass.

Indicators, Surface Test

Federal Products Corp., Providence, R. I.
Starrett Co., L. S., Athol, Mass.

Jigs and Fixtures

American Tool Works, Inc., Hartford, Conn.
Hamilton Tool Company, Hamilton, Ohio
Hartford Special Machinery Co., Hartford, Conn.

Joints, Universal

Apex Machine Co., Dayton, Ohio

Keyseating Machines

Burr & Son, John T., Brooklyn, N. Y.

Lathe Centers

Nielsen, Inc., Lawton, Mich.

Lathe Live Centers

Modern Machine Corp., Brooklyn, N. Y.
Motor Tool Mfg. Co., Detroit, Mich.

Lathe Drives

Cushman Wheel Co., 1359 Altgeld St., Chicago
Hardinge Brothers, Inc., Elmira, N. Y.

Lathe, Back Geared

Atlas Press Co., Kalamazoo, Mich.
Rivett Lathe & Grinder, Inc., Brighton, Boston
South Bend Lathe Works, South Bend, Ind.

Lathe, Bench

Atlas Press Co., Kalamazoo, Mich.
Delta Mfg. Co., Milwaukee, Wis.
Hardinge Brothers, Inc., Elmira, N. Y.
Rivett Lathe & Grinder, Inc., Brighton, Boston
South Bend Lathe Works, South Bend, Ind.

Lathe, Manufacturing

Sundstrand Machine Tool Co., Rockford, Ill.

Lathe, Polishing & Buffing

Hammond Machinery Builders, Kalamazoo, Mich.
Hardinge Brothers, Inc., Elmira, N. Y.

Lathe, Precision

Gilman Engineering Works, Janesville, Wis.

Lathe, Precision Bench

Stark Tool Company, Waltham, Mass.

Lathe, Screw Cutting

Atlas Press Co., Kalamazoo, Mich.
Hardinge Brothers, Inc., Elmira, N. Y.
South Bend Lathe Works, South Bend, Ind.

Lathe, Speed

Schnaur Machine Co., Cincinnati, Ohio

Lathe, Toolroom

Atlas Press Co., Kalamazoo, Mich.
Hardinge Brothers, Inc., Elmira, N. Y.
South Bend Lathe Works, South Bend, Ind.

Layout Fluid

Dayton Rogers Mfg. Co., Minneapolis, Minn.

Layout Plates

Challenge Machinery Co., Grand Haven, Mich.

Leader Pins, Steel

Acme Industrial Co., 210 Laflin St., Chicago, Ill.

Leather Oil Retainers

Gits Bros. Mfg. Co., 1860 S. Kilbourn, Chicago

Lights, Movable, Industrial

Zagora Mch. & Gear Co., J., Charlotte, N. C.

Live Lathe Centers

Glenzer Company, J. C., Detroit, Mich.
Modern Machine Corp., Brooklyn, N. Y.
Motor Tool Mfg. Co., Detroit, Mich.

Lock Forming Machines, Power

Ward Machinery Co., 564 W. Washington, Chicago, Ill.

Lubricators, Air

Norgren, C. A., Denver, Colorado

Lubricators, Automatic

M-B Products Co., Detroit, Mich.
Norgren Co., C. A., Denver, Colorado

Magnetic Chuck Demagnetizers

Electro-Matic Products Co., 4820 Deming Place, Chicago, Ill.

Mandrels

Lee & Son Co., K. O., Aberdeen, S. Dak.

Mandrels, Expanding

W. H. Nicholson & Co., Wilkes-Barre, Pa.
Western Tool & Mfg. Co., Springfield, Ohio

Marking Machines

Ideal Commutator Dresser Co., Sycamore, Ill.
Schmidt, Geo. T., Inc., 1802 Belle Plaine Ave., Chicago, Ill.

Buyers' Directory

Milling Attachments

Bridgeport Machines, Inc., Bridgeport, Conn.
 Burke Machine Tool Co., Connecticut, Ohio
 Wm. Carroll & Son, Norwood, Cincinnati, Ohio
 Dalrae Tools Company, Syracuse, N. Y.
 Kearney & Trecker Corp., Milwaukee, Wis.

Milling Machine Live Centers

Motor Tool Mfg. Co., Detroit, Mich.

Milling Machines, Bench

Burke Machine Tool Co., Connecticut, Ohio
 Hardinge Brothers, Inc., Elmira, N. Y.
 Sundstrand Machine Tool Co., Rockford, Ill.

Milling Machines, Hand

Burke Machine Tool Co., Connecticut, Ohio
 Sundstrand Machine Tool Co., Rockford, Ill.

Milling Machines, Plain

Burke Machine Tool Co., Connecticut, Ohio
 Kearney & Trecker Corp., Milwaukee, Wis.
 Sundstrand Machine Tool Co., Rockford, Ill.

Milling Machines, Universal

Brown & Sharpe Mfg. Co., Providence, R. I.
 Gorton Machine Co., Geo., Racine, Wis.
 Kearney & Trecker Corp., Milwaukee, Wis.

Milling Machines, Vertical

Blank & Buxton Mch. Co., Jackson, Mich.
 Gilman Eng. Works, Janesville, Wis.
 Gorton Machine Co., Geo., Racine, Wis.
 Kearney & Trecker Corp., Milwaukee, Wis.

Motors, Electric

Janette Mfg. Co., 552 W. Monroe St., Chicago
 Lincoln Electric Co., Cleveland, Ohio

Motor-Generator Sets

Chicago Electric Co., 1330 W. Cermak Rd., Chgo.
 Janette Mfg. Co., 552 W. Monroe St., Chicago

Motor Drives, Universal

Berkeley Engineering Co., Cleveland, Ohio
 Cullman Wheel Co., 1350 Altgeld St., Chicago
 Powermaster, 25 E. Fourth St., New York, N. Y.
 Steege Machinery Co., 548 W. Monroe St., Chicago, Ill.

Turner Uni-Drive Co., Kansas City, Mo.

Moulds & Ladles, Hammer and Vise

Johnson Tool Co., East Providence, R. I.

Multiple Oilers

Gits Bros. Mfg. Co., 1860 S. Kilbourn, Chicago

Nibbling Machines

National Machine Tool Co., Racine, Wis.

Oil Cups

Gits Bros. Mfg. Co., 1860 S. Kilbourn, Chicago

Oil Gauges

Gits Bros. Mfg. Co., 1860 S. Kilbourn, Chicago

Oil and Grease Seals

Gits Bros. Mfg. Co., 1860 S. Kilbourn, Chicago

Oilers, Automatic

Trico Fuse Mfg. Co., Milwaukee, Wis.

Pans, Tote

Pasman Bros., 705 W. Washington, Chicago

Parallels

Ford Motor Co., Johansson Div., Dearborn, Mich.

Patternmakers Tools

Hoover Tool Co., Anderson, Ind.

Pins, Leader and Dowel

Acme Industrial Co., 210 Ladin St., Chicago, Ill.
 Baumbach Mfg. Co., E. A., 1812 So. Kilbourne Ave., Chicago, Ill.

Pipe Cutters

Ridge Tool Co., Elyria, Ohio

Pipe Vises

Ridge Tool Co., Elyria, Ohio

Pipe Wrenches

Ridge Tool Co., Elyria, Ohio

Plates, Surface and Bench

Master Tapper Company, Belleville, N. J.

Pliers, Toggle

Knu-Vise Products Co., Detroit, Mich.

Point Thinning Machines

Oliver Instrument Co., Adrian, Mich.

Power Devices, Air-hydraulic

Logansport Machine, Inc., Logansport, Ind.

Press Brakes

Dreis & Krump Mfg. Co., 7440 Loomis Blvd., Chicago, Ill.

Verson Allsteel Press Co., 9303 S. Kenwood Ave., Chicago, Ill.

Ward Machinery Co., 564 W. Washington, Chicago, Ill.

Press Feeds

Littell Machine Co., E. J., 4153 Ravenswood Ave., Chicago, Ill.

Wittke Mfg. Co., 4309 W. 24th Place, Chicago

Presses, Arbor

Atlas Press Co., Kalamazoo, Mich.
 Greenerd Arbor Press Co., Nashua, N. H.
 Hanna Engineering Works, 1763 Elston, Chicago
 W. H. Nicholson & Co., Wilkes-Barre, Pa.
 Tomkins-Johnson Co., Jackson, Mich.
 Wilson, K. R., Buffalo, N. Y.

Presses, Bench

Atlas Press Co., Kalamazoo, Mich.
 Greenerd Arbor Press Co., Nashua, N. H.
 Loshbough-Jordan Tool & Mch. Co., Elkhart, Ind.

Presses, Broaching

Greenerd Arbor Press Co., Nashua, N. H.

Presses, Foot

Ward Machinery Co., 564 W. Washington, Chicago, Ill.

Presses, Forming

Marshalltown Mfg. Co., Marshalltown, Ia.

Presses, Hydraulic

Atlas Press Co., Kalamazoo, Mich.
 Beatty Mch. & Mfg. Co., Hammond, Ind.
 Greenerd Arbor Press Co., Nashua, N. H.

Presses, Inclinable

Federal Press Co., Elkhart, Indiana.
 Loshbough-Jordan Tool & Mch. Co., Elkhart, Ind.
 Marshalltown Mfg. Co., Marshalltown, Ia.
 Ross Co., David J., Benton Harbor, Mich.

Presses, Power

Dreis & Krump Mfg. Co., 7440 Loomis Blvd., Chicago, Ill.

Federal Press Co., Elkhart, Indiana
 Verson Allsteel Press Co., 9303 S. Kenwood Ave., Chicago, Ill.

Presses, Punch

Dreis & Krump Mfg. Co., 7440 Loomis Blvd., Chicago, Ill.
 Lewthwaite Machine Co., 311 E. 47th St., New York, N. Y.
 Marshalltown Mfg. Co., Marshalltown, Ia.
 Ross Co., David J., Benton Harbor, Mich.

Presses, Sheet Metal

Federal Press Co., Elkhart, Indiana

Presses, Steel

Verson Allsteel Press Co., 9303 S. Kenwood Ave., Chicago, Ill.

Buyers' Directory

Profiling Machines

Gorton Machine Co., Geo., Racine, Wis.
Oliver Instrument Co., Adrian, Mich.

Pulleys

Congress Tool & Die Co., Detroit, Mich.

Pulleys, Die Cast

Chicago Die Cast. Mfg. Co., 2502 W. Monroe, Chicago.

Pulleys, Steel and Wood

Delta Mfg. Co., Milwaukee, Wis.

Pulleys, Vacuum Cup

Vacuum Cup Metal Pulley Co., Detroit, Mich.

Pumps

Brown & Sharpe Mfg. Co., Providence, R. I.
Galland-Henning Mfg. Co., Milwaukee, Wis.

Pumps, Centrifugal

Logansport Machine, Inc., Logansport, Ind.

Pumps, Coolant

Ruthman Machinery Co., Cincinnati, Ohio
Tomkins-Johnson Co., Jackson, Mich.

Pumps, Lubricant

Ruthman Machinery Co., Cincinnati, Ohio

Punch, Shear and Bender, Hand

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.
Buffalo Forge Co., Buffalo, N. Y.

Punch Press Guards

Ross Co., David J., Benton Harbor, Mich.

Punches and Dies

Lewthwaite Machine Co., 311 E. 47th St., New York, N. Y.

Punches, Hand

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.
Buffalo Forge Company, Buffalo, N. Y.
Lewthwaite Machine Co., 311 E. 47th St., New York, N. Y.
Simpson Tool Co., 101 Walker St., New York
Ward Machinery Co., 564 W. Washington, Chicago, Ill.
Whitney Metal Tool Co., Rockford, Ill.

Punches, Multiple Power

Beatty Mch. & Mfg. Co., Hammond, Ind.

Punches, Transfer

McMahon Co., Frank, Dayton, Ohio

Quick Change Collets & Chucks

Jarvis Co., Charles L., Middletown, Conn.

Racks, Bar Stock

Western Tool & Mfg. Co., Springfield, Ohio
Wm. S. Yohe Supply Co., Canton, Ohio

Reamers

Glenzer Co., J. C., Detroit, Mich.

Rivets, Tubular and Split

Chicago Rivet & Machine Co., 1855 S. 54th St., Cicero, P. O. Chicago, Ill.

Riveters, Automatic Feed

Chicago Rivet & Machine Co., 1855 S. 54th St., Cicero, P. O. Chicago, Ill.
Tomkins-Johnson Co., Jackson, Mich.

Riveters, Multiple Spindle

Grant Mfg. & Machine Co., Bridgeport, Conn.

Riveters, Pneumatic

Grant Mfg. & Machine Co., Bridgeport, Conn.
Hanna Engineering Works, 1763 Elston Ave., Chicago, Ill.

Riveting Machines

Buffalo Forge Co., Buffalo, N. Y.
Grant Mfg. & Machine Co., Bridgeport, Conn.
Hanna Engineering Works, 1763 Elston Ave., Chicago, Ill.

Riveting Machines, Tubular and Split

Chicago Rivet & Machine Co., 1855 S. 54th St., Cicero, P. O. Chicago, Ill.

Rod Cutters

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.
Lewthwaite Machine Co., 311 E. 47th St., New York, N. Y.

Rotary Converters

Janette Mfg. Co., 556 W. Monroe St., Chicago

Rotary Files

Ford Mfg. Co., M. A., Davenport, Iowa
Grobet File Corp. of America, 3 Park Place, New York, N. Y.
Hamilton Tool Co., Hamilton, Ohio
Jarvis Co., Charles L., Middletown, Conn.
Pratt & Whitney Div., Hartford, Conn.

Router Bits

American Rotary Tools Co., 44 Whitehall St., New York, N. Y.
Putnam Tool Co., Detroit, Mich.

Sanders

Jarvis Co., Charles L., Middletown, Conn.
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
Stanley Electric Tool Div., New Britain, Conn.

Saws

Black Diamond Saw & Machine Works, Inc., Natick, Mass.

Saws, Electric Hand

Delta Mfg. Co., Milwaukee, Wis.
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
Stanley Electric Tool Div., New Britain, Conn.

Saws, Metal Cutting

Racine Tool & Mch. Co., Racine, Wis.

Saws, Rotary Hack

Stanley Electric Tool Div., New Britain, Conn.

Saw Sharpening Machines

Wardwell Manufacturing Co., Cleveland, Ohio

Sawing Machines

Continental Machine Specialties, Minneapolis
Delta Mfg. Co., Milwaukee, Wis.
Grob Brothers, Grafton, Wis.
Wells Mfg. Co., Three Rivers, Mich.

Scraping Machines, Hand & Pneumatic

Anderson Bros. Mfg. Co., Rockford, Ill.

Screw Drivers, Electric

Haskins Co., R. G., 623 S. California, Chicago.
Jarvis Co., Charles L., Middletown, Conn.
Stanley Electric Tool Div., New Britain, Conn.

Screw Drivers, Hand (Phillips)

Apex Mch. & Tool Co., Dayton, Ohio

Screw Driver Bits (Phillips & slotted screws)

Apex Mch. & Tool Co., Dayton, Ohio

Screw Machine Parts

Modern Collet & Machine Co., Ecorse, Mich.
Sutton Tool Company, Detroit, Mich.

Buyers' Directory

- Screw Machine Products**
Economy Machine Products Co., 5207 Lawrence Ave., Chicago, Ill.
- Screw Machines, Automatic**
Brown & Sharpe Mfg. Co., Providence, R. I.
- Screws**
Strong, Carlisle & Hammond Co., Cleveland, O.
- Scribers**
Ford Motor Co., Johanson Div., Dearborn, Mich.
Starrett Co., 1, S., Athol, Mass.
- Set Screws, Headless and Hollow**
Economy Machine Products Co., 5207 Lawrence Ave., Chicago, Ill.
Safety Socket Screw Corp., 4440 N. Knox Ave., Chicago, Ill.
Standard Pressed Steel Co., Jenkintown, Pa.
Triplex Screw Co., Cleveland, Ohio
- Set-Up Appliances**
Standard Shop Equipment Co., Inc., Phila., Pa.
- Shafts, Flexible**
Haskins Co., R. G., 623 S. California, Chicago.
Jarvis Co., Charles L., Middletown, Conn.
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
Pratt & Whitney, Hartford, Conn.
Strand Co., N. A., 5001 N. Wolcott St., Chicago
- Shafts, Hangers & Boxes**
Delta Mfg. Co., Milwaukee, Wis.
- Shapers**
Atlas Press Co., Kalamazoo, Mich.
- Shaping Machines**
Osborne & Sexton Machinery Co., Columbus, O.
- Shears, Bevel**
Marshalltown Mfg. Co., Marshalltown, Ia.
Ward Machinery Co., 504 W. Washington, Chicago, Ill.
- Shears, Electric**
Ward Machinery Co., 504 W. Washington, Chicago, Ill.
- Shears, Hand**
Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.
Beverly Shear Co., 3007 W. 110th Pl., Chicago
Lewthwaite Machine Co., 311 E. 47th St., New York, N. Y.
National Machine Tool Co., Racine, Wis.
Whitney Metal Tool Co., Rockford, Ill.
- Shears, Power**
Beatty Mch. & Mfg. Co., Hammond, Ind.
Buffalo Forge Co., Buffalo, N. Y.
Dreis & Krump Mfg. Co., 7440 Loomis, Chicago
Stanley Electric Tool Div., New Britain, Conn.
Ward Machinery Co., 504 W. Washington, Chicago, Ill.
- Shears, Slitting**
Beverly Shear Co., 3007 W. 110th Pl., Chicago
Buffalo Forge Co., Buffalo, N. Y.
Dreis & Krump Mfg. Co., 7400 Loomis, Chicago
National Machine Tool Co., Racine, Wis.
- Shears, Splitting**
Marshalltown Mfg. Co., Marshalltown, Ia.
- Shears, Throatless**
Beverly Shear Co., 3007 W. 110th Pl., Chicago
Marshalltown Mfg. Co., Marshalltown, Ia.
- Sheet Metal Working Machinery**
Ward Machinery Co., 504 W. Washington, Chicago, Ill.
- Shelving, Steel**
Interior Steel Equipment Co., Cleveland, Ohio
- Shop Lights**
Vimco Mfg. Co., Buffalo, N. Y.
Zagora Mch. & Gear Co., J., Charlotte, N. C.
- Sine Bars**
Ford Motor Co., Johanson Div., Dearborn, Mich.
- Sine Tables**
Robbins Company, Omer E., Detroit, Mich.
- Sleeves**
Glensier Company, J. C., Detroit, Mich.
- Socket Head Cap Screws**
Economy Machine Products Co., 5207 Lawrence Ave., Chicago, Ill.
Safety Socket Screw Corp., 4440 N. Knox Ave., Chicago, Ill.
Standard Pressed Steel Co., Jenkintown, Pa.
- Soldering Tools, Electric**
Ideal Commutator Dresser Co., Sycamore, Ill.
- Spacing Collars**
Scully-Jones & Co., 1905 S. Rockwell St., Chicago, Ill.
- Special Tools and Machinery**
Americann Tool Works, Inc., Hartford, Conn.
Beatty Mch. & Mfg. Co., Hammond, Ind.
- Speed Reducers**
Aart Gear & Mch. Co., 4832 W. 16th St., Chgo.
Armigo Co., Milwaukee, Wis.
Chicago Gear Works, 709 W. Jackson Blvd., Chicago, Ill.
Cullman Wheel Co., 1359 Altgeld St., Chicago
Jaquette Mfg. Co., 552 W. Monroe St., Chicago
- Speed Saws, Universal**
Wyzenbeck & Staff, Inc., 838 W. Hubbard, Chgo.
- Spools & Nuts for Auto. Screw Machines**
Sutton Tool Co., Detroit, Mich.
- Split Rivets**
Chicago Rivet & Machine Co., 1855 S. 54th St., Cicero, P. O. Chicago, Ill.
- Split Rivet Setters, Automatic Feed**
Chicago Rivet & Machine Co., 1855 S. 54th St., Cicero, P. O. Chicago, Ill.
- Spot Welding Machines, Speed**
Armigo Co., Milwaukee, Wis.
Eisler Engineering Co., Inc., Newark, N. J.
Interstate Machinery Co., Chicago, Ill.
Pier Equipment Mfg. Co., Benton Harbor, Mich.
- Sprockets**
Cullman Wheel Co., 1359 Altgeld St., Chicago
- Stake Riveters**
Marshalltown Mfg. Co., Marshalltown, Ia.
- Stampings**
Hamilton Tool Co., Hamilton, Ohio
- Steam Specialties**
Strong, Carlisle & Hammond Co., Cleveland, O.
- Steel**
Ryerson & Son, Jos. T., 16th & Rockwell, Chgo.
- Stools, Shop**
Standard Pressed Steel Co., Jenkintown, Pa.
- Storage Racks**
Interior Steel Equipment Co., Cleveland, Ohio
Stackbin Corp., Providence, R. I.
Yohs Supply Co., Canton, Ohio
- Straightening Machines**
Whitney Metal Tool Co., Rockford, Ill.
- Stripping Units**
Strippit Corp., Buffalo, N. Y.
- Stud Setters**
Apex Machine Co., Dayton, Ohio
- Studs, Milled**
Safety Socket Screw Corp., 4440 N. Knox Ave., Chicago, Ill.
- Tables, Sine**
Robbins Company, Omer E., Detroit, Mich.
- Tables, Spacing**
Beatty Mch. & Mfg. Co., Hammond, Ind.
- Tap Extractors**
Walton Co., Hartford, Conn.

Buyers' Directory

Tap Holders

Procurier Safety Chuck Co., 14 S. Clinton St., Chicago, Ill.
Scully-Jones & Co., 1905 S. Rockwell St., Chicago, Ill.

Taps, Collapsing and Solid Adj.

Rickert-Shafer Co., Erie, Penna.

Tapes, Steel

Starrett Co., L. S., Athol, Mass.

Tapping Machines and Attachments

Burke Machine Tool Co., Connecticut, Ohio
Errington Mechanical Laboratories, Staten Island, N. Y.
Ettco Tool Co., 504 Johnson Ave., Brooklyn, N. Y.
Haskins Company, R. G., 623 S. California Ave., Chicago, Ill.
Jarvis Co., Charles L., Middletown, Conn.
Master Tapper Company, Belleville, N. J.
Procurier Safety Chuck Co., 14 So. Clinton St., Chicago, Ill.
Whitney Metal Tool Co., Rockford, Ill.

Threading Machines, Automatic

Grant Mfg. & Machine Co., Bridgeport, Conn.
Rickert-Shafer Co., Erie, Penna.

Threading Tools

Armstrong Bros. Tool Co., 308 N. Francisco Ave., Chicago, Ill.
Ridge Tool Co., Elyria, Ohio
Rivett Lathe & Grinder, Inc., Brighton, Boston

Tool Holders

Armstrong Bros. Tool Co., 308 N. Francisco Ave., Chicago, Ill.
Michigan Tool Co., Detroit, Mich.
Western Tool & Mfg. Co., Springfield, Ohio

Tool Post Turrets

Colwell, S. G., Providence, R. I.

Tool Reclaiming

Machinists Tool Grinding Co., 2834 W. Lake St., Chicago, Ill.
Renn Tool Co., Detroit, Mich.

Toolroom Machinery, Combination

Gilman Eng. Works, Janesville, Wis.

Tools, Boring

Armstrong Bros. Tool Co., 308 N. Francisco Ave., Chicago, Ill.
Comet Tools, Inc., 39 Union Square, New York

Tools, Cutting

Carboloy Co., Detroit, Mich.

Tools, Filing

Hoover Tool Co., Anderson, Ind.

Tools, Lathes and Planer

Armstrong Bros. Tool Co., 308 N. Francisco Ave., Chicago, Ill.

Tools, Machinists'

Armstrong Bros. Tool Co., 308 N. Francisco Ave., Chicago, Ill.
Brown & Sharpe Mfg. Co., Providence, R. I.

Tools, Sawing

Hoover Tool Co., Anderson, Ind.

Tracing Sheets

Wade Instrument Co., Cleveland, Ohio.

Tram Points

Ford Motor Co., Johanson Div., Dearborn, Mich.

Transmissions, Variable Speed

Ideal Commutator Dresser Co., Sycamore, Ill.
Lenney Machine & Mfg. Co., Warren, Ohio

Tube Flanging Machines

Grant Mfg. & Mch. Co., Bridgeport, Conn.

Tubular Rivet Setters, Automatic Feed

Chicago Rivet & Machine Co., 1855 S. 54th St., Cicero, P. O. Chicago, Ill.

Tungsten Carbide Tools

Metal Carbides Corp., Youngstown, Ohio
Willey's Carbide Tool Co., Detroit, Mich.

Turning Tools

R & I Tools, Philadelphia, Pa.

Universal Joints

American Tool works, Inc., Hartford, Conn.

Used and Rebuilt Machinery

Aaron Machinery Co., 176 Lafayette St., N. Y.
Belyea Company, Jersey City, N. J.
Bennet-Ratkin Machine Tool Corp., 30 Church St., New York, N. Y.
Bernstein & Co., Geo. M., 12 S. Clinton, Chgo.
Bleaser Mfg. & Mch. Co., Springfield, Ill.
Botwinik Brothers, Inc., New Haven, Conn.
Brown Machinery Co., St. Louis, Mo.
Cincinnati Machy. & Supply Co., Cincinnati, O.
Clinton Machinery Co., 33 S. Clinton St., Chicago
Daltz, Harry, Cleveland, Ohio
Dean Co., E. S., 642 W. Wash., Chicago.
Denny & Clark, 910 N. Marshall, Chicago.
Eastern Machinery Co., Cincinnati, Ohio
Egan Co., Dallas, Tex.
Emmerman, Louis E. & Co., 1761 Elston, Chicago
Essley Machinery Co., E. L., 831 W. Evergreen Ave., Chicago, Ill.
Falk Mill Supply Co., Inc., Rochester, N. Y.
General Blower Co., 401 N. Peoria St., Chicago
George, James W., Detroit, Mich.
Hill, Clarke & Co., 645 W. Washington, Chgo.
Hyman & Sons, Joseph, Philadelphia, Pa.
Indianapolis Mch. & Supply Co., Indianapolis
Industrial Machinery Co., Indianapolis, Ind.
Inland Machinery Co., 41 S. Clinton, Chicago.
International Machinery Co., Detroit, Mich.
Infretate Machinery Co., 109 S. Clinton, Chgo.
Iroquois Machinery Co., Buffalo, N. Y.
Johnson & Sons Mch. Co., Wm. C., St. Louis
Jones Machine Tool Co., Cincinnati, Ohio
Kleuber Machinery Co., St. Louis, Mo.
Lake Machinery Co., 636 W. Lake, Chicago.
Lang Machinery Co., Pittsburgh, Pa.
Lucas & Son, J. L., Bridgeport, Conn.
McDonald Machinery Co., St. Louis, Mo.
Marr-Galbreath Mch. Co., Pittsburgh, Pa.
Midwest Equipment Co., 628 W. Lake, Chicago
Miles Machinery Co., 2625 Genesee Ave., Saginaw, Mich.
Morer Machinery Co., Inc., 410 Broome St., New York, N. Y.
Morris Machinery Company, Inc., Newark, N. J.
Nelson Machinery Co., Green Bay, Wis.
Norton-Broadway Machinery Co., Cincinnati, O.
O'Brien Machinery Co., Philadelphia, Pa.
Osborne & Sexton Machinery Co., Columbus, O.
Ott Machinery Sales Co., Detroit, Mich.
Powell, W. L., San Antonio, Texas
Reliance Machinery Sales Co., Pittsburgh, Pa.
Reynolds Machinery, Providence, R. I.
Rich Ladder & Mfg. Co., Cincinnati, O.

Buyers' Directory

Used and Rebuilt Machinery—Cont.

Rosenkranz & Weisbecker, 2309-A Singer Bldg., New York City
 Royal Machinery Exchange, 401 Broome St., New York, N. Y.
 Scott-Bambach Mch. Co., 4007 W. 20th, Chgo.
 Seag Machinery Co., 117 S. Clinton St., Chicago
 Service Co., Cleveland, Ohio
 Simmons Machine Tool Corp., Albany, N. Y.
 Smith Mch. Co., E. W., Columbus, Ohio
 Standard Machinery Co., Grand Rapids, Mich.
 Strong, Carlisle & Hammond Co., Cleveland, O.
 Surplus Material & Machinery Co., Detroit, Mich.
 Surplus Stock & Mch. Co., Inc., 618 W. Lake St., Chicago, Ill.
 Turner Mch. Co., Kansas City, Mo.
 United Machinery & Supply Co., St. Louis, Mo.
 Victor Machinery Co., 130 S. Clinton, Chicago
 Victor Machinery Exchange, 251 Centre St., New York, N. Y.
 Vine, R. A., Detroit, Mich.
 West Penn Machinery Co., Pittsburgh, Pa.
 White Mch. Co., A. D., 108 N. Jefferson, Chgo.
 Wigglesworth Machinery Co., Cambridge, Mass.
 Wolnick Mch. Co., H. F., 9 S. Clinton, Chicago.

Vacuum Cleaners, Industrial

Breuer Elec. Mfg. Co., 5108 N. Ravenswood, Chicago

Vacuum Cleaners, Portable

Breuer Elec. Mfg. Co., 5108 N. Ravenswood, Chicago

Valves, Air

Berkeley Engineering Co., Cleveland, Ohio
 Galland-Henning Mfg. Co., Milwaukee, Wis.
 Hanna Engineering Works, 1763 Elston, Chicago
 Logansport Machine, Inc., Logansport, Ind.
 Nicholson & Co., Wilkes-Barre, Penna.
 Tomkins-Johnson Co., Jackson, Mich.

Valves

Berkeley Engineering Co., Cleveland, Ohio
 Galland-Henning Mfg. Co., Milwaukee, Wis.
 Hanna Engineering Works, 1763 Elston, Chicago
 Ross Operating Valve Co., Detroit, Mich.

Valves, Foot, Lever & Solenoid

Berkeley Engineering Co., Cleveland, Ohio
 Hanna Engineering Works, 1763 Elston, Chicago
 Nicholson & Co., W. H., Wilkes-Barre, Pa.

Valves, Hydraulic

Berkeley Engineering Co., Cleveland, Ohio
 Galland-Henning Mfg. Co., Milwaukee, Wis.
 Hanna Engineering Works, 1763 Elston, Chicago
 Nicholson & Co., Wilkes-Barre, Penna.

Valves, Operating

Berkeley Engineering Co., Cleveland, Ohio
 Galland-Henning Mfg. Co., Milwaukee, Wis.
 Hanna Engineering Works, 1763 Elston, Chicago

Vises, Drilling Machine

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.
 Armstrong Bros. Tool Co., 308 N. Francisco Av., Chicago, Ill.
 Johnson Tool Co., Inc., East Providence, R. I.
 L-W Chuck Co., Toledo, Ohio
 Modern Machine Tool Co., Jackson, Mich.
 National Machine Tool Co., Racine, Wis.
 Plunket Machine Co., 1823 W. Lake St., Chicago
 Sampson Tool Co., 101 Walker St., New York
 Yost Mfg. Co., Meadville, Pa.

Vises, Machinists'

Diamond-Stephan Mfg. Co., Urbana, Ohio
 L-W Chuck Co., Toledo, Ohio

Odin Universal Corp., 110 S. Dearborn, Chicago
 Western Tool & Mfg. Co., Springfield, Ohio
 Yost Mfg. Co., Meadville, Pa.

Vises, Milling Machine

Hartford Special Mch. Co., Hartford, Conn.
 Knu-Vise Products Co., Detroit, Mich.
 L-W Chuck Co., Toledo, Ohio
 Plunket Machine Co., 1823 W. Lake St., Chicago
 Yost Mfg. Co., Meadville, Pa.

Vises, Shaper

L-W Chuck Co., Toledo, Ohio
 Plunket Machine Co., 1823 W. Lake St., Chicago

Vises, Special

Modern Machine Tool Co., Jackson, Mich.

Welders, Arc

Chicago Electric Co., 1330 W. Cermak Rd., Chgo.
 Hobart Brothers, Troy, Ohio
 Pier Equipment Mfg. Co., Benton Harbor, Mich.

Welders, Arc, Diesel Driven

Lincoln Electric Co., Cleveland, Ohio

Welders, Automatic, A. C.

Lincoln Electric Co., Cleveland, Ohio

Welders, Arc, Engine Driven

Lincoln Electric Co., Cleveland, Ohio

Welders, Portable

Chicago Electric Co., 1330 W. Cermak Rd., Chgo.
 Hobart Brothers, Troy, Ohio
 Lincoln Electric Co., Cleveland, Ohio

Welding Accessories

Hobart Brothers, Troy, Ohio
 Lincoln Electric Co., Cleveland, Ohio

Welding Electrodes and Holders

Hobart Brothers, Troy, Ohio
 Lincoln Electric Co., Cleveland, Ohio

Welding Generators, Arc

Chicago Electric Co., 1330 W. Cermak Rd., Chgo.
 Hobart Brothers, Troy, Ohio
 Lincoln Electric Co., Cleveland, Ohio

Welding Machines, Electric Spot

Armco Co., Milwaukee, Wis.
 Elster Engineering Co., Inc., Newark, N. J.
 Interstate Machinery Co., Chicago, Ill.
 Pier Equipment Mfg. Co., Benton Harbor, Mich.
 Ward Machinery Co., 594 W. Washington, Chicago, Ill.

Welding Machines and Equipment, E. I. Arc

Hobart Brothers, Troy, Ohio
 Pier Equipment Mfg. Co., Benton Harbor, Mich.

Welding Machines, Resistance

Armco Co., Milwaukee, Wis.
 Elster Engineering Co., Inc., Newark, N. J.
 Pier Equipment Mfg. Co., Benton Harbor, Mich.

Welding Protective Equipment

Lincoln Electric Co., Cleveland, Ohio

Wire Working Equipment

Sleeper & Hartley, Inc., Worcester, Mass.

Wire Working Machinery

Sleeper & Hartley, Inc., Worcester, Mass.

Woodworking Machinery

Tannewitz Works, Grand Rapids, Mich.

Wrenches, Socket, Plain

Apex Mch. & Tool Co., Dayton, Ohio

Wrenches, Socket, Univ. Joint Type

Apex Mch. & Tool Co., Dayton, Ohio

Used and Rebuilt Machinery

Classified Section

Lists of Used and Rebuilt Machinery, either For Sale, Wanted, or For Exchange, set in uniform style, will be published in the Classified Section at the rate of \$5.00 for your name and address and a five line advertisement. For additional lines, 40c per line.

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Aaron Machinery Co.,

176 Lafayette St., New York, N. Y.

Engraving machines, Gorton & Deckel, all sizes.	
Grinder, B. & S. No. 2 universal	\$575
Grinders, Reid No. 2 hand surface	285
Lathe, Reed 36"x16", 30" chuck	585
Lathe, McCabe 24"x14", complete	350
Millers, Becker, Nos. 2 and 2A vertical	
Miller, No. 8A Owens univ., div. vert. heads	875
Miller, Kemp Smith No. 1 universal	475
Pipe machine, 6", Williams, arr. motor drive	350
Pipe machine, 6" Oster No. 316	325
Press, horning, Bliss No. 16, latest type	175
Shaper, 16" G. & E., cone, heavy duty, rebuilt	395

FOR SALE BY

Segal Machinery Company

117 S. Clinton St., Chicago, Ill.

Air compressors, 10x10 Inger-Rand, Class E. R. I.	
Boring mill, 42" Bullard, two heads on rail	
Radial drills, 3" Hickford, s. p. d., motor drive	
5" Niles-Bement-Pond, single pulley drive	
Lathes, 18x18 Sebastian, motor in base, g. c. g.	
24x12 Milwaukee, semi-g. c. g. taper attachment	
Millers, No. 4B Becker vertical, power feed	
No. 2 Kemp Smith universal, dividing head	
Screw machines, 14" Acme universal, geared head	
Shaper, 20" G. & E., hi-duty, 28" American b. g.	
Partial list — Send us your inquiries.	

FOR SALE BY

J. Clifford Luera,

c/o Hotel Moraine, Dayton, Ohio

Cutter grinder, No. 1 Wilmarth & Morman univ., m. d.	
Drill press, 16" Canedy Otto, b. d., tank, pump	
Grinder, 6"x18" Landis plain, motor drive	
Lathe, 18"x8" Mueller, g. c. d. b. g., 3 step cone, t. a.	
Motor, 20 h. p. Louis Allis, b. b., 1200 r. p. m., with one	
Morse silent chain and guard	
Shaper, 24" Columbia, b. g., b. d., vise, etc.	
Tapping machine, 4" Geometric, m. d., with 1" J & L die head	

These machines in excellent condition—Lots of valuable extras with each machine—Established prices on above items place them in real bargain class—Write or wire for prices.

FOR SALE BY

Turner Machinery Co.

1638 Central St., Kansas City, Mo.

Lathe, 18"x8" American, geared head	\$ 850
Lathe, 18"x14" Hamilton, geared head	1475
Milling machine, No. 14 Rockford with universal equipment, arranged for motor drive	850
Planer, 42"x42"x14" Ohio, two heads	1175
Screw machine, No. 6 B. & S., wire feed	750
Shaper, 24" Cincinnati, motor driven	990

FOR SALE BY

Norton-Broadway Machinery Co.

610-614 Baymiller St., Cincinnati, Ohio

Lathe, 18"x12" geared head, motor driven	
Lathe, 24"x16 or 18" geared head, motor driven	
Shaper, 24" to 28" s. p. d. a. c., motor driven	
Shear, square, 5-6 or 8"x8" capacity	

FOR SALE BY

J. Bleser Mfg. & Machinery Co.

209 N. 16th; P.O. Box 793 Springfield, Ill.

Lathe, 36"x18" L. & S., g. c., arr. m. d.	\$1500
Milling machine, No. 6 Transit, d. b. g.	300
Shaper, 32" American, with vise	285
Shear for 33 angles, 14" round	195
Steam pump 12x7x10 Worth, duplex	50

FOR SALE BY

Faylor-Strafer Machinery Co.

136 Liberty St., New York, N. Y.

Bolt cutter, 2" Landis double head, motor drive	
Brakes, Ohl Power Press, 10"x10 ga. and 3/16"	
Crane, 10 ton Niles 37" span, a. c. motors	
Grinder, No. 14 Pratt & Whitney b. b., vert. surface	
Grinder, No. 16 Blanchard high power vert., sur., m. d.	
Lathe, 26"x14" Bridgeford, geared head, m. d., taper	
Lathe, 48"x34" Bridgeford geared head, motor drive	
Lathes, turret, (2) 24" Libby h. d. Model C, m. d.	
Miller, Becker, duplex Lincoln type	
Miller, Brown & Sharpe No. 24 plain	
Shear, squaring, 30" Bliss, capacity 5/16"	
Shear, squaring 16" Geo. Ohl, cap. 3/16", motor drive	
Table, circular, 42" mounted on base with cross adjust.	

USED AND REBUILT MACHINERY

FOR SALE BY

E. L. Klauber Machinery Co.
320-322 South Third St. St. Louis, Mo.

Band saw, Klemm metal, 30" wheels, 12" vise, mtr. dr.
 Lathes, 10", 12", 13", 14", 15", 16" cone drive.
 Presses, No. 33 Swaine; 20 Bliss o. b. i. No. 71W Bliss-s.
 Riveters, No. 3-A high speed, No. 2 Grant; hamm. type.
 Screw machines, No. 0 B & S hand; 1, 2, 3 and 4 Foster.
 Shapers, 16", 20", and 24" Cincinnati, cone drive.
 Threading machines, Landis, 1" and 2" single head.

FOR SALE BY

General Blower Company
401 N. Peoria St., - Chicago, Ill.

BLOWERS—FANS—EXHAUSTERS.
 For Dust Collection—Ventilating.
 Oil and gas burners, cupolas, furnaces, etc.
 Roots—Connersville and centrifugal blowers.
 What are your blower requirements?

FOR SALE BY

Reliance Machinery Sales Company
1405 Brighton Place, N. S. Pittsburgh, Pa.

Air compressor, 1190 cu. ft. Ingersoll-Rand.
 Drill, 3 spindle Foote-Burt, adj. head, No. 5 MT.
 Boring mill, 42" Bullard, New Era type.
 Drills, radial, 3", 3", 4" and 5" tapping attachment.
 Grinder, No. 2 Greenfield universal tool and cutter.
 Grinder, No. 2 Brown & Sharpe surface, motor drive.
 Lathe, 30"x18" New Haven, cone head, cheap.
 Miller, No. 4 Cincinnati, plain, cone.
 Miller, No. 5 H. & S., plain, table 16"x54", cone.
 Planer, 36"x36"x12" Cincinnati, 2 heads.
 Press, No. 6 Toledo, o. b. i., 34" stroke.
 Press, No. 56 Toledo geared, 1" shaft 8" stroke, high die space (26"); about 35,000 lbs.
 Press, No. 97C Toledo, dbl. crank, 9" shaft, 72" wide, 2" stroke.
 Press, Waterbury, open back, geared, 3" shaft, 5" stroke, weight about 4000 lbs.
 Shapers, 16", 20" and 24", various makes.
 Wire straightener & cut-off, 1/2"x5" Shuster.
 What do you need? What have you for sale?

FOR SALE BY

Russell Machine Co.
438 Oliver Bldg. Pittsburgh, Pa.

Boring mill, 72" Betts vertical, belt drive.
 Boring mill, 14/20" Niles ext. type vertical.
 Boring mill, hor., N. B. P. 48" lat floor type.
 Crane, 10 ton hand power traveling, 46'8" span.
 Drill, radial, 6" Niles universal, m. d.
 Generating set, 400 k. w., a. c. steam.
 Hammer, 5000 lb. double frame NBP steam.
 Lathe, 26"x11" Wickes heavy duty, double back gear.
 Lathe, turret No. 2-A W & S ser. above 125,000.
 Lathe, 52"x23" Pond triple geared.
 Milling machine, plain, No. 3 Cincinnati.
 Pipe cutting and threading machine 46"8" Merrill.
 Planer, Cincinnati 36"x36"x10" table.
 Press, wheel, 200 ton hydraulic, 48x100", motor drive.
 Press, No. 20 Bliss o. b. i., m. d. with motor.
 Shaper, 24" Gould & Eberhardt.
 Shear, alligator, United, cap. 8" square.
 Shear, plate, L. & A cap. 82"x14".
 Straightener, No. 1 Kane & Roach, cap. 3" rd. m. d.
 Upsetting machines, 24", 34" and 54" Ajax iron bed.

FOR SALE BY

Joseph Hyman & Sons,
Tioga and Almond Sts., Philadelphia, Pa.
WORLD'S LARGEST STOCK

POWER PRESSES
 No. 64 Bliss, double crank, tie rod, 48" shaft 64"
 No. 138 Bliss, double crank, 79" bet. ups. crank 8"
 No. 165S Consolidated, double crank, 41", shaft 48"
 No. 73 & 74 Consolidated cap. types.
 No. 34-B and No. 4 Bliss toggle presses.
 No. 25A Niagara, toggle press, tie rod, 8" shaft.
 No. 594 Toledo, tie rod, No. 201 Ferracut, 200 ton.
 6 & 5 plunger Waterbury Fairall presses.
 500 ton American Can Coining, 250 ton E.G. 53 Ferracut.
 150 ton No. E. 52 Ferracut; 75 ton No. E51 Ferracut.
 150 ton No. 661 Toledo, 250 ton Waterbury F. coining.
 100 ton No. 21 Bliss, 50 ton No. 3 Bliss coining.
 Squaring shears, various sizes.
 These and hundreds of others of popular makes and sizes, are in stock at our warehouse here.
 Rebuilt and Guaranteed.

FOR SALE BY

Wm. C. Johnson & Sons Machy. Co.
1211 Hadley St., St. Louis, Mo.

Air compressors, 15 in stock.
 Bender, No. 2, Williams White.
 Boring machine, 34" Landis m. d. like new.
 Boring machine, 44" Betts.
 Boring mills, 6"-8" & 8"-12" Betts.
 Boring mills, 14" & 16" Niles.
 Boring mills, 40" Colling: 36" King.
 Brake, 10" Robinson, 3/16" plate.
 Die slotter, Garvin, 34" stroke.
 Drill, radial, 4" Drees.
 Drills, 15" to 42" Barnes.
 Gear hobber, No. 3 Adams.
 Hammer, steam, 2500 to 250 lbs.
 Lathe, 18"x5" Boye & Emmes q. c.
 Lathes, turret, 24" Steiner; and 20"
 Lathes, turret, No. 3B & O; No. 6 Wood.
 Lathe, 36"x15" Amer. q. c. g. cone head.
 Miller, No. 24 Rockford universal, s. p.
 Millers, Nos. 3 & 4 H. & S. plain.
 Pipe machines, 2"-4"-6"-8"-12".
 Press, 407 A Bliss double crank toggle.
 Presses, Nos. 2, 3 & 4 Marshalltown.
 Shapers, 12"-16"-20"-24".
 Punches, shears, build-zers.

FOR SALE BY

Surplus Material & Machinery Co.
8735 Kercheval Ave., Detroit, Mich.

Boring mill, Collum, 36" swing, cone drive.
 Boring mills, model C & model SD Becker, s. p. d.
 Butt welders, 75 kw Taylor-Winfield; 35 kw Thompson;
 and 35 kw Federal, all 220 volt.
 Electric motor, 175 KVA Ailis-Chalmers, synchronous;
 3/60/440, 900 r. p. m.
 Electric motor, 125 h. p., G. E., 3/60/440, 890 r. p. m.
 Folder, 42" Jarecki, power.
 Grinder, Walker rotary surface, 108" chuck.
 Hammers, 1500 lb., 1200 lb., & 1000 lb. Chambersburg,
 board drop, (7).
 Lathe, 14"x10" Hendey, geared head, motor drive.
 Lathe, 18"x8" Hendey, yoke head, arr. for m. d.
 Leveling roll, 11 roll Yoder, 4 1/16"x53" rolls.
 Mills, No. 4 Cincinnati plain, (2).
 Projection welder, 100 kw Federal, 220 volt.
 Press, No. 23-J Bliss, double crank, arr. for m. d.
 Press, No. 75 Toledo, open back, straight side.
 Presses, No. PG4, P4, P3, and P2 Ferracut.
 Press, No. 43-F Toledo, boring, arr. for m. d.

USED AND REBUILT MACHINERY

FOR SALE BY

Industrial Machinery Company, Inc.
2200-2300 Fletcher Av. Indianapolis, Ind.

Turret lathe, Libby 26" Model "C", motor driven, 7½" hole through spindle.

FOR SALE BY

The E. L. Essley Machinery Co.
631 W. Evergreen Ave., Chicago, Ill.

Automatics, Nos. 60, No. 0G, No. 0, B. & S.
 Grinder, No. 3 Diamond surface, motor drive.
 Lathe, 36" x 16" American, h. d.
 Miller, No. 2 Kempsmith max., motor drive.
 Press, No. A-3½ Niagara, o. b. l., 55 ton.

FOR SALE BY

Rosenkranz, Weisbecker & Company, Inc.
2308 Singer Building, New York, N. Y.

Boring mills, 5" & 6½" bar Derrick & Harvey, m. d.
 Boring mill, 60" Gisholt, rapid traverse, motor drive.
 Boring mill, 42" Niles-Bement-Pond vertical, m. d.
 Drill, multiple spindle, No. 20 Natco, m. d., 20" round hd.
 Grinder, 26" x 120" Landis, plain, cylindrical, m. d.
 Grinder, Cincinnati 24", face mill, motor drive.
 Keyseaters, No. 3½ Baker and No. 20 Catlin, m. d.
 Lathe, 72" x 40" Putnam, geared head, motor drive.
 Lathe, 64" x 25" Gleason, motor drive.
 Lathe, 42" x 18" Pittsburgh, quick change gear.
 Planer, 72" Morton draw-cut traveling head, arranged for boring, milling and drilling, motor drive.
 Planer, 72" x 72" x 16" Cincinnati, 4 heads, m. d.
 Saw, No. 300 Espen-Lucas, hydraulic feed, motor dr.

FOR SALE BY

West Penn Machinery Company

Air compressors, 30 to 2500 cubic feet.
 Automatic National Acme "C" 9/16, m. d. 220/3/60.
 Blower, No. 4 Roots, capacity 2110 c. f. m.
 Boring mill, 42" King, belt drive.
 Boring mill, 62" Betts, 2 heads, belt drive.
 Boring mill, hor. 38" Rockford m. d. 220/3/60.
 Boring mill, horizontal, 38" D. & H.
 Bulldozers, Nos. 2, 4, 6, 8, 28, & 30.
 Crane, 5-ton Case, 65' span, 220-d. c.
 Drill, radial 15" Cincinnati-Bickford, motor drive 220 d. c.
 Drill, radial, 5" Fostick m. d. 220/3/60.
 Drill, radial 6" Reed-Prentice, single pulley drive.
 Drill, 4 spindle Avey, 220/3/60 No. 2 M. T.
 Drill, multiple 25 spindle No. 30 Natco.
 Drills, upright 10" to 36".
 Engine, gas, 20 horse power Bessemer.
 Flanger, McCabe, 4" capacity, dies.
 Flanger, No. 208 Niagara, 10 Ga. b. d.
 Gear cutter, No. 5 Brown & Sharpe, 50x11 motor drive.
 Gear cutters, 11", 18" & 24" Gleason.
 Gear tester, bevel 18" Gleason.
 Grinder, centerless, No. 2 Cincinnati m. d. 220/3/60.
 Grinder, roll, Farrel 28" x 76".
 Grinder, double end 2 horse power 220/440/3/60.
 Grinder, D. E., 3 horse power 220/3/60.
 Grinders, U. S. h. p. 220/3/60.
 Grinder, disc, No. 8-20" Besly, belt drive.
 Grinder, disc, No. 4 Gardner, motor drive, 220/3/60.
 Grinder, Gisholt tool and cutter, motor drive, 220/3/60.
 Grinder, surface 8" Heald b. d.
 Grinder, internal No. 60 Heald, belt drive.
 Groover, No. 275-A Niagara, 6", 16 ga. motor drive.
 Hammer, power, 50-lbs. Blacker.
 Hammer, power, 90-lb. upright, belt drive.
 Hammer, power, 100 lb. Bradley-cushion helve.
 Hammer, Bradley 500 lb. upright.
 Hammers, Nos. 2-B, 3-B, 4-B, 6-B, Nazel.
 Hammers, steam, forging & drop.
 Hoist, 1 ton Shephard 220-V. direct current.
 Keyseater, No. 2 & No. 0 Mitts & Merrill, belt drive.
 Ladles, 20 ton Whiting, top pour.
 Lathe, 16" x 6" Fostick, double back gear, q. c. g.
 Lathe, 20x10 geared head Schellenbach, s. p. d.
 Lathe, 22" x 12" E. L. quick change gear, d. b. g.
 Lathe, 24x10 Lodge & Shipley, q. c. g., d. b. g., t. a.
 Lathe, 24" x 15" Prentice, geared head s. p. d., t. a.
 Lathe, 42" x 16" Schumacher Boye, q. c. g., belt drive.
 Lathe, spinning 32" belt drive.
 Lathes, turret, No. 4 Warner & Swasey, belt drive.
 Lathe, turret, No. 2A, Warner & Swasey, 34" m. d.
 Lathe, turret, 17x6 LeBlond double back gear 1½".
 Miller, vertical No. 2 Knight, b. d.
 Miller, vertical No. 6 Becker, motor drive.
 Mixers, Sprout-Waldron, batch & liquid.
 Pipe machine, 2" Landis, belt drive.

1210 House Building,

Pittsburg, Pa.

Pipe machine, 4" Oster 220-3-60 motor drive.
 Pipe mach, 2", 6", 8", 12" Williams, motor drive.
 Pipe machine, 8" Landis, motor drive.
 Planer, 36x36x10" Cincinnati belt drive.
 Planer, 42x42" x 12" Cincinnati, 3 heads, belt drive.
 Planer, 60x60x20" Pond motor drive.
 Press, wheel 150 ton Caldwell, 42", b. d.
 Press, hydraulic 100-ton Southwark.
 Press, horning 42-A Toledo belt drive.
 Press, 19 Bliss open back inclinable 2½" stroke.
 Press, No. 4 Toledo o. b. l., 34" stroke, roll feed.
 Press, No. 55 Toledo, bed 20x18.
 Press, No. 58 Toledo, 8" stroke.
 Press, No. 77½ Bliss, 8" stroke.
 Press, 78½ Bliss, 12" stroke T. R.
 Press, double crank No. 5 Bliss, 2" stroke, b. d.
 Press, gap, No. 74 Bliss consolidated 4½" stroke.
 Press, screw, No. 87 Niagara, hand power.
 Press, 5 spindle, Waterbury-Farrell.
 Punch, E. F. Cleveland, 36" throat, 1½" thru 1".
 Punch, No. 4-A Kent Owens univ. comb., m. d. 220/3/60.
 Pumps, centrifugal 6", 4", 1", motor drive.
 Riveters, air, hammer, spinning.
 Rolls, angle, Niagara 14x14x4.
 Rolls, angle, Buffalo, 4x4x4, motor drive.
 Rolls, plate 10x14 H. & J., motor drive.
 Rolling mill, cold 9" x 16" motor drive.
 Saws, friction, Nos. 2, 3 & 4 Ryerson motor drive.
 Saw, cold, 48" Newton motor drive.
 Saw, hack, Peerless, 6x6, 220-3-60.
 Shapers, 16", 20", 21" & 26" Gould & Eberhardt.
 Shears, alligator, 14", 2", 3", 4" & 6".
 Shear, Angle 6x6x1 Long & Allstatter, m. d.
 Shear, circle, Niagara, 4" cutters, 16 ga.
 Shear, circle No. 3 Bliss, 40" x 20 gauge.
 Shear, bar 14", New Doty, b. d.
 Shear, squaring No. 45 Eccello 14 ga. bls. 53".
 Shear, plate, 60" x 14" Pels.
 Shear, rotary 24" throat capacity 1", m. d. 220/3/60.
 Slitter, gang, 36" Voder motor drive.
 Slitter, gang, 36" Braddock, belt drive.
 Shear, paper 45" x 14" Kent, belt drive.
 Shear, throatless, 4" Marshalltown, motor drive.
 Sloters, 6" & 24" Newton.
 Straightener, 9/16" x 20" Shuster V belt.
 Straightener, AS & TP 12x13/16", m. d. 220/3/60.
 Straightener, 42" Aetna std. 17 roll 24" m. d. 220/3/60.
 Straightener, 48" Aetna-Standard, 17 roll 38" m. d.
 Straightener, No. 5 K & R, 24" square belt drive.
 Tumbling barrel, 34" x 45", belt drive.
 Thread roller, 7 W. F., capacity 1½".
 Thread roller, No. 201 V. & O., 4", belt drive.
 Upsetters, 1" to 6".
 Welder, spot 13 k. v. a., Taylor.
 Welder, butt 14" Winfield.

USED AND REBUILT MACHINERY

FOR SALE BY

Nelson Machinery Co., Green Bay, Wis.

Boilers, used rebuilt, all sizes, power and heating.
Compressor, Ingersoll Rand 12x10 class E-R-1, with
Idler, unloader, and 50 HP S.I. R. mtr. and control.
Generators, 200 k. w. Westinghouse, 3-60-2300-514
beltd, with field rheostats (2).
Grinder, No. 11 Cochrane-Bly auto. saw sharpener,
capacity 32".
Motor, 30 h. p., G. E. vertical KT 336, 3-60-440-1150.
Planer, 30x30x8' Gray, belt drive, single head.

FOR SALE BY

Standard Machinery Co.,
347 Indiana Ave. Grand Rapids, Mich.

Automatic, 14" Gridley, model F.
Boring mill, 42" Bullard vertical.
Boring mill, 24" Lucas horizontal.
Cold saw, 6' Higley.
Drill, Baker's heavy duty.
Drill grinder, Sellers 3" capacity.
Grinders, No. 60 Heald Cylinder (2).
Grinders, No. 2 LaSalle (2).
Lathes, 9" Porter-Cable manufacturing (14).
Miller, model C-1 Becker heavy vertical.
Shaper, 15" Hendey, F. G.

FOR SALE BY

Belyea Company, Inc.

Main Office and Plant

50 Howell Street, Jersey City, N. J.

New York Office

150 W. 18th St., New York City, N. Y.

GUARANTEED electric motors, generators, m. g.
sets, transformers, frequency changers, gas eng. sets,
rotary converters, centrifugal pumps, condensers,
starting equipment. All sizes. Largest stock in the
East. Prompt delivery. We also buy and exchange.

FOR SALE BY

Surplus Stock & Machinery Co.,

620 W. Lake St., Chicago, Ill.

Drill presses, 1, 2, 3 and 4 spindle, h. s., b. t., all
makes, Nos. 1 and 2 Morse taper, hand or power fd.
Lathe, 16" x10' Monarch, grd. head, motor in base.
Mill, No. 2B Brown & Sharpe plain, s. p. d.
Punch press, No. 5 Marshalltown o. b. l., 3" stroke.
Punch press, No. 54 Walsh o. b. l., back geared.
Shapers, 16", 20", 24" Gould & Eberhardt.
Complete stock of metal working machinery.
Send us your inquiries.

FOR SALE BY

Lang Machinery Company

28th St. & A. V. R. R.

Pittsburg, Pa.

Air compressors, (2) Sullivan, 450 c. f. 160 lb. b. m. d.
Automatic, No. 6 Brown & Sharpe belt drive.
Automatic, No. 12 National Acme 4 spindle, cap. 4" b. d.
Automatic, model M Cleveland, 4 spindle, 3" motor drive.
Bender, No. S19 Kane & Roach, 4" rd. motor drive.
Bolt cutter, 18" Landis, 1 1/2" Acme, sgl. hd., b. d.
Boring mill, 30" Bullard, threading attach., s. p. d.
Boring mill, 72" Betts, 2 hds., thd. att., b. d.
Boring mill, vertical 84" Sellers, 2 hds., belt drive.
Boring mill, hor. 24" bar Lucas, tbl. type, b. d.
Boring mill, hor. 48" N. B. F. high column, m. d.
Boring mill, hor. 6" Cement-Miles, floor type, m. d.
Borer, port., N. B. P. Duplex, 44" bars, m. d.
Brakes, leaf, Chicago, 7 x10 ga., 8 x12 ga., 10 x10 ga.,
10 x13/16", 10 x18 ga. hand.
Brake, press type, 8 x20 ga. Vulcan, b. d.
Buffer and polisher, 7 1/2 h. p. Marschke, 220/3/60.
Corrugating roll, 4" Keene, 1" s. p. d.
Drill, heavy duty No. 1 Baker, 24" capacity 2 1/2", s. p. d.
Drill, radial, 6" N-B-P univ., a. c. m. d.
Drills, radial, 2 1/2" Cincinnati-Bickford, t. a. m. d.
Drills, upright, 14" to 32", belt drive.
Drill, 4 spindle No. 2 Foote-Burt, cap. 1 1/2", m. d.
Gear hobber, No. 18H Gould & Eberhardt, m. d.
Gear millers, No. 1 Bilton, capacity 4" belt drive.
Grinder, crankshaft, 18" x12" Norton, m. d.
Grinder, surface, No. 2 Reid, 18" x8", belt drive.
Grinder, surface, 12" Pratt & Whitney vertical, m. d.
Hammer, 100 lb. Bradley cushion belve belt drive.
Hammer, No. 4-Nazel, a. c. motor drive.
Keyseaters, No. 2 Baker, 2", belt drive.
Keyseater, No. 4 Mitts & Merrill capacity 24" b. d.
Lathe, 14" x8" Hendey, tie bar, q. c. g. t. a., b. d.
Lathe, 16" x8" American high duty, q. c. g. t. a., b. d.
Lathes, 20" x9" Lehmann geared head, s. p. d.
Lathe, 20" x24" Lodge & Shipley, q. c. g., b. d.
Lathe, 24" x14" Lodge & Shipley, q. c. g. t. a., b. d.
Lathe, 25" x10" LeBlond, q. c. g. d. b. g. chk., t. a., b. d.
Lathe, 25" x12" Bridgeford, hvy. duty, q. c. g. d. b. g., b. d.
Lathe, 30" x16" N-B-P, q. c. g. t. a., b. d.
Lathe, 40" x40" H-S. & G. geared head, m. d.
Lathe, 51" x32" New Haven, triple geared, motor drive.
Lathe, roll, 54" x24" Standard, motor drive.
Lathe, turret, No. 2-A Warner & Swasey, s. p. d.
Lathe, turret, 24" Steins, 64" hollow spindle, m. d.

Miller, duplex, No. 3 Nan Norman, s. p. d.
Miller, plain, No. 1 Kempsmith, 42" x10", belt drive.
Miller, plain, No. 2 Cincinnati, tbl. 46" x10", b. d.
Miller, plain, No. 2 LeBlond, tbl. 52" x11-8", b. d.
Miller, plain No. 28 Ohio, table 52" x14", belt drive.
Miller, plain No. 4 LeBlond, table 72" x16", belt drive.
Miller, plain, No. 24 Brown & S. tbl. 50" x12", b. d.
Miller, production No. 33 Kempsmith belt drive.
Miller, universal No. 2B Hendey tbl. 48" x10", b. d.
Miller, vertical, model "B" Becker tbl. 57" x12", s. p. d.
Pipe machines, Landis 1" to 2", belt drive, (2).
Pipe machine, No. 304-B Oster, 1" to 4", motor drive.
Pipe machine, 8" Williams, 2" to 8" motor drive.
Pipe machine, No. 114 Merrill, 2 1/2" to 13", motor drive.
Planers, 36" x36" x10" Cincinnati, 2 hds., belt drive.
Press, arch, No. 52 Toledo, str. 4 1/2", m. d.
Press, double acting, No. 1 Bliss, belt drive.
Presses, No. 5 Bliss styles type, bed 17" x20", str. 2", b. d.
Press, No. 35 Bliss, dbl. crk., str. 3 1/2", m. d.
Press, No. 53 Toledo, dbl. crk., str. 3", m. d.
Press, trimming, No. 12 Erie, bed 26", str. 5 1/2", side sh.
Press, wheel, 200-ton Hydraulic, 48" x100", m. d.
Profilers, Nos. E3 and E4, Keller, 1" to 4" drive.
Punch & shear, "C" Cleveland 13/16" x2" belt drive.
Punch and shear, Cleveland "G", 2 1/2", 1", 8" throat.
Riveting hammer, No. 54H high spec., 1" d.
Rolls, angle, Kane & Roach 2 1/2" x2 1/2" motor drive.
Saw, hack, No. 7 Atkins, 8" x8", motor drive.
Saw, hack, 9" x9" Racine, m. d.
Saws, hack, 12" x12" Racine, single pulley drive.
Shaper, 28" Queen City, cone or Lima earshift, m. d.
Shaper, 24" G. & E. cone or Lima gearshift, m. d.
Shaper, 24" Smith & Mills, cone or earshift, m. d.
Shaper, 26" Cincinnati cone or Lima gearshift, m. d.
Shaper, 16" American, cone or Lima gearshift, m. d.
Shear, rotary, No. 10 Quickwork, 14 ga. 60" throat.
Shear, rotary, Lennox, 12" 42" throat, b. d.
Shear, square 36" x16" Niagara motor drive.
Shear, squaring No. 242 Niagara, 42" x14 ga. m. d.
Shear, squaring, 10" x22 ga. Peerless, foot.
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Milling machine, pl. No. 3 Cin., s. p. d.
Milling machine, univ. No. 4 B. & S. cone.
Milling machine, pl. No. 3 Cincinnati, cone.
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Model F & G 225 to 450
Automatic screw mch., Gridley, 3/4" single spindle 200
Automatic screw mch., Gridley 4 1/2" single spindle 450
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- 27"x16" American Geared Head, m.d.
- 27"x12" Prentice Geared Head, m.d., taper.
- 25"x12" LeBlond, cone.
- 24"x20" LeBlond, cone.
- 24"x11" Chard, cone.
- 24"x10" Greaves-Klusman, cone.
- 24"x8" Hendey Yoke Head, taper.
- 22"x12" Greaves-Klusman, G. Head, taper.
- 22"x8" LeBlond Geared Head, taper.
- 20"x9" Lehmann Geared Head, taper.
- 20"x8" American Geared Head, taper, 12 s.
- 20"x8" American Geared Head, 8 speed.
- 18"x10" Prentice Geared Head.
- 18"x8" Prentice Geared Head.
- 18"x8" American Geared Head.
- 17"x8" Sidney, cone.
- 16"x12" Prentice Geared Head.
- 16"x8" American, cone.
- 16"x6" Hendey Yoke Head, taper.
- 16"x8" American Geared Head.
- 14"x7" Lodge & Shipley, cone.
- 14"x6" Hendey Geared Head, taper.
- 12"x6" Hendey Geared Head, taper.

SHAPERS

- 15" Potter & Johnston Universal, m.d.
- 16", 24" Cincinnati, m.d.
- 16" Smith & Mills, cone.
- 20" Queen City, cone.
- 20" Smith & Mills, cone.
- 20" American, m.d.
- 24" Gould & Eberhardt, m.d.
- 24" Stockbridge, m.d.

BOLT THREADERS

- 2 spindle 9/16" Landis, m.d.
- 2 spindle 1" Acme, cone.
- 2 spindle 1½" Landis, m.d.
- 3 spindle 1" Acme, cone.
- 1 spindle 1½" Acme, cone.
- American Bolt Heading Machine, 1¼" cap.

GRINDERS

- 6x18", 10x24", 10x30", 10x52", 10x72", 12x52", 12x72", 10x52", 10x52", 20x144" Landis Plain Cylindrical, m.d.
- 6x52", 10x30" 10x50", 10x72", 12x72", 16x30" Norton Plain Cylindrical, belt & m.d. types.
- 8x30" Modern Plain Cylindrical, m.d.
- 10x18", 10x30" Brown & Sharpe, belt.
- 10x36" Landis Integral Cam Grinder, m.d.
- 12x18" Cincinnati Plain Self-Con. Cyl., 3 m.d.
- 12x30" Cincinnati Plain Cylindrical, belt.
- No. 1 Wilmarth & Morman Universal, belt.
- No. 3 Brown & Sharpe Universal, belt.
- No. 3 Bryant Semi-Auto. Hole Grinder, m.d.
- No. 11 Giddings & Lewis Tormatic, m.d.
- No. 15A Bryant Semi-A. 2 sp. Hole & Face, m.d.
- No. 2, 3 Brown & Sharpe Auto. Surface, belt.
- No. 10U Norton Lapper, m.d.
- No. 33 Abrasive Vertical Surface, m.d. in base.
- 6x10x36" Norton Type G Surface, m.d.
- 14" Pratt & Whitney Vertical Surface, m.d.
- 18x48" Diamond Light Duty Face, m.d.
- 30x84" Diamond H.D. Face, m.d.

TURRET LATHES

- No. 2A, 3A Warner & Swasey Universal, m.d.
- No. 2, 4, 6 Warner & Swasey, belt.
- No. 4, 7 Bardons & Oliver, belt.
- Gisholt Simplomatic, m.d.
- 21", 24" Gisholt, belt.
- No. 4 Warner & Swasey Universal, cone.
- No. 4 Warner & Swasey Universal, geared head.
- No. 5A, 6A Potter & Johnston Automatics, m.d.
- 3x30" Jones & Lamson Turret, m.d.

MILLING MACHINES

- No. 5 Cin. Plain, rect. overarm, Timken Bear.
- No. 2, 3, 4 Cincinnati Plain, s.p.d.
- No. 1½, 2, 3, 4, 5 Cincinnati Plain, cone.
- No. 1, 2 Cleveland Plain, s.p.d.
- No. 13B B. & S. Pl., Nat. Stand. Spdl., s.p.d.
- No. 1½A, 2A Brown & Sharpe Universal, m.d.
- No. 2 Rockford Universal, m.d.
- No. 4 Cincinnati Vert., s.p.d., flanged spindle.
- No. 4B, 5, 6 Becker Vertical, cone.
- 48" Cincinnati Duplex Automatic, m.d., late.
- 48" Cincinnati Plain Automatic, m.d., late.
- 24" Cincinnati Pl. and Dup. Auto., m.d., late.
- 48" Oesterlein Tilted Offset, m.d., Timken B.
- 6x80" Pratt & Whitney Thread, belt.

More than 1500 Machines in Stock

THE EASTERN MACHINERY CO.
1000 Tennessee Avenue
Cincinnati, Ohio

MODERN MACHINE TOOLS

Nos. 00G & 0G B. & S. Automatics.
 3" Universal Horizontal Boring Mill, M. D.
 3 Spindle Leland-Gifford B.B. Drill Press, motor and
 pwr. fd. on each spindle, 12" overh., No. 4 taper.
 No. 11 Brown & Sharpe Cylindrical Grinder, m. d.
 No. 13 Brown & Sharpe Universal & Tool Grinder,
 complete with parts.
 Lathes, 12" to 40" swing, m. d.
 No. 14 Coch-Bly Duplex Univ. Vert. Miller-Shaper.

No. 4-B K. & T. plain Milling Mch., dbl. overarm,
 motor-in base, with Timken bearing, power feed,
 rotary table—99% new.
 No. 2B Brown & Sharpe Plain Milling Machine, m. d.
 No. 2BS K. & T. (Milwaukee) Pl. Mill. Mch. S.P.D.
 Punch Presses: Nos. 1 to 6 O. B. I.
 12" & 16" Arter Rotary Surface Grinders.
 Nos. 2A & 6 Warner & Swasey Screw Machines,
 motor-in-base, Timken Bearing, bar feed.

350 MACHINE TOOLS IN STOCK

VICTOR MACHINERY CO. 130-132 South Clinton St.,
 Chicago, Illinois

REBUILT - IMMEDIATE DELIVERY

No. 4-G LeBlond Plain Miller, S. P. D.
 No. 3-B Milwaukee Universal Miller full equipment
 and vertical attachment, S. P. D.
 No. 3 Le Blond plain miller, cone.
 No. 2-A Garvin universal miller, cone.
 24" Gould & Eberhardt Shaper, cone.
 No. 8-E Niagara Squaring Shear, 3/16" cap., m. d.
 4½" Morris Radial, gear box.
 3½" American radial, gear box.
 No. 1 Hoosier Heavy Duty Drill, M. D.

24"x10' swings 27½" Greaves-Klusman heavy duty
 Lathe, 20" 4 Jaw chuck cone.
 21"x12' Le Blond Lathe, cone.
 14"x6' Hendey Lathe, cone.
 12"x72" Landis Plain Grinder.
 No. 11 B. & S. plain grinder.
 14" Pratt & Whitney surface grinder.
 3-Spindle Leland-Gifford Drill, with tapping heads,
 pump and piping, No. 2 M. T.
 No. 1-B and No. 2-B Edlund 2 spindle Drills.

IROQUOIS MACHINERY CO., 660 Ohio St., Buffalo, Y. N.

PARTIAL LIST—LOW PRICES

MILLING MACHINES

No. 3B Hvy. B. & S. Plain M. D.
 No. 2 B. & S. Universal.
 No. 3 Kempnith Plain.
 No. 2 Cincinnati Plain.
 No. 1A—K. & T. Plain.
SHAPERS & PLANERS
 24" Cincinnati.
 24" Kelley.
 20" Steptoe S. P. D.

16" Cincinnati S. P. D.

36x36x10 Ohio Planer 2 Heads.

LATHES

36"x16' New Haven Q. C.
 24"x8' Schumacher Boye Q. C.
 16"x6' American Taper Attach.
 16"x6' Prentice Geared Head.
 16"x6' Monarch Grd. Hd. M. D.
 14"x6' American Grd. Hd. M. D.
 14"x6' American, Cone.

GRINDERS

14x50 Norton Plain M. D.
 6x30 B. & S. Plain.

No. 2 Bath Universal.

No. 3 Cincinnati Tool & Cutter.

MISCELLANEOUS

Nos. 12, 1, & 7 B. & S. Scr. Mchs.
 4½" Gridley Auto. Sgls. Spdle.
 6 Spindle Holmes Tapper.
 No. 99 Stoll Toggle Press 5" Crk.

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1 to 7 North St. Clair St.,

Toledo, Ohio

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1100, 571, 368, 340, and 80 CFM 100 lb. pressure
 motor driven air compressors.
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 compressors.
 2" Syntron type R60, 1 phase, 60 cycle, 110 volt
 electric hammer.
 600, 300, 200, 100, and 50 KW 250 volt DC aynch.
 motor generator sets.

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1—500 Amp. Westinghouse constant potential.
 3—300 Amp. Lincoln portable, A. C. motors.
 4—200 Amp. Lincoln portable, A. C. motors.
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 1—17 KW Acme 18" throat spot welder.

Complete stock AC and DC motors, generators,
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BORING MACHINES

No. 1 Cleveland, 2½" bar.
No. 3-A Universal, 3" bar.
No. 2 Rochester, 3" bar.
No. 1 Lambert, 3" bar.
No. 3 Hamilton, 4½" bar, Fl. Type.
5" bar N-B-P Floor Type.

BORING MILLS

No. 1-A Pratt & Whitney Jig Borer.
24", 36", 42" Bullard "New Era".
42", 48", 54", 60" Colburn.
30", 52" 62", 72" King.

DRILLS

1, 2, 3, 4, 6-spdl. Leland-Gifford.
1, 2, 3, 4, 6, 8-spdl. Henry & Wright.
No. 2 Colburn, 1, 2, 3, 4 Spindle.
No. 4 Colburn, 2 Spdl.
No. 14 Colburn, Motor Drive.
No. 2, No. 3 Defiance Hvy. Service.
Nos. 314, 416 Baker.
No. D-4 Colburn Heavy Duty.
No. 1, No. 3, No. 4 Baush Multiple.
3½", 4" Western Plain Radial.
4" Fosdick Plain Radial.
4", 5" Cinn-Bickford Plain Radial.
4"-5", 6" American Triple Purpose Radial.

GEAR CUTTERS

No. 4-36", No. 4-48" Brown & Sharpe.
No. 3-52", Plauter Hobber.
No. 6-60" Brown & Sharpe.
Nos. 6, 61, 615, 62, 624, 645 Fellows, M.D.
No. 7 Fellows, Motor Drive, Late Type.
18" Gleason Tester & Lapper, Motor Drive.

GRINDERS

8"x18", 36" Cincinnati Plain, Saddle Type.
20"x16" Landis Pl., Motor Drive.
26"x96" Landis.
No. 2½ Universal (Bath Type).
No. 2 Brown & Sharpe Universal.
No. 4, No. 4-A Landis Universal.
No. 70 Heald Internal.
No. 10-16" Blanchard Vert. Surface.
No. 16-A Blanchard Auto. Vert. Surface.
No. 2-18"x6" Reid Surface (New).
No. 2-18", No. 6-26" Gardner B. B. Disc.

LATHES

14"x6" Hendey, Taper Attach.
14"x8" Le Blond Grd. Hd. motor drive.
16"x6", 8" Lodge & Shipley Sel. Grd. Hd.
17"x8" Le Blond Hvy. Duty Grd. Hd. M.D.
18"x6" Monarch Grd. Hd., Motor-in-Base.
18"x12" Lodge & Shipley.
19"x8" Le Blond Hvy. Duty Grd. Hd. M.D.
20"x14" Lodge & Shipley Sel. Grd. Hd.

NORTON MOTOR DRIVEN GRINDERS

6"x32"	10"x50"	14"x96"
10"x18"	10"x72"	16"x50"
10"x24"	14"x36"	16"x72"
10"-15" gapx24"	14"x50"	18"x96"
10"x36"	14"x72"	22"x120"

22"x12" Lodge & Shipley, multiple stops.
24"x12", 14", 16" Lodge & Shipley Sel. Geared Head.
24"x14", 16" American, Geared Head.
30"x11", 15" American, Geared Head.
30"x16" American taper attach.
33"-60"x16" Le Blond Geared Head Sliding Bed Gap Lathe.
36"x14", 20" Lodge & Shipley Sel. Grd. Hd.
66"x21" Putnam Triple Geared, M.D.

MILLERS

No. 2 Standard Milwaukee Pl., M.I.B.
No. 2-B Milwaukee Plain, M.I.B.
No. 2, No. 3 Cincinnati, Plain.
No. 3-B, No. 4-B Hvy., Brown & Sharpe, Pl.
No. 4 Cincinnati, Plain.
No. 1½, No. 2 B. & S. Universal.
No. 2-B, No. 3-B Milwaukee Universal.
No. 4-A Brown & Sharpe Universal.
No. 2, No. 3 Cincinnati H. P. Vertical.
No. 5-B, No. 6, No. C-2 Becker Vertical.
No. 5-48" Cincinnati Hydromatic.
6"x14", 6"x48" Pratt & Whitney Thread.
No. 3E, No. 8 Leets-Bradner Thread.

PLANERS

30"x30"x6", 18" Cincinnati.
30"x30"x14" Gray, reversing motor dr.
36"x36"x8", 12", 18" Cincinnati.
36"x36"x12" Gray Maximum Service, M.D.
36"x36"x14"-24" Cleveland Open Side.
42"x42"x14" Gray.
42"x42"x30" Niles-Bement-Pond, Rev. M.D.
48"x48"x10" Detrick & Harvey, Open Side.
48"x48"x16" Niles-Bement-Pond.
72"x48"x10" Cincinnati.
72"x60"x16" American Widened Pattern.
72"x72"x16" Cincinnati M.D.

TURRET LATHES

No. 5 Foster Univ. Tur., A. C. & W. F.
No. 1-B Foster Universal.
No. 1-A, No. 2-A, No. 3-A Wgr. & Swasey.
No. 3 Cinn-Acme, A. C. & B. F.
No. 4-A Warner & Swasey, 4¼" H.S.

MISCELLANEOUS

No. 211 Barnes B.B. Honing Machine.
No. 10U Norton Univ. Lapper, M.I.B.
2" Landis Pipe Machine.
No. 5-6" Saunders Pipe Machine
15"-18" Dill Slotter.

HILL-CLARKE MACHINERY CO.
645 W. WASHINGTON BOULEVARD, CHICAGO

BORING MILLS, Horiz.

- 2 $\frac{1}{2}$ " bar N.B.P., knee, M.D.
 3 $\frac{1}{2}$ " G. & L. No. 32.
 4" bar Gisholt, knee, M.D.
 5" bar Niles Floor type.
 5" Barrett No. 2 Cyl. Borer.
 6" bar N.B.P. Floor type, M.D.

BORING MILLS, Vertical

- 7-10" Betts Ext. type.
 51" Bullard, Cone Drive.

DRILLS, Radial

- 6", 7" Cincinnati, Gear box.
 6" Amer. Univ. & Plain.
 6" Reed Prentice, G. B. M.D.
 6" Mueller, Gear box, M.D.
 4" Cincinnati, Gear box.
 4" American Triple Geared.
 3" American, Sensitive.
 32" Cincinnati, Tapping, M.D.
 2, 4 & 6 Spindle Allens.
 4 Spindle No. 2B Edlund.
 4 Spindle Kokomo, No. 3 M.T.

GRINDERS

- 10"x30" Landis Plain (3).
 12"x32" No. 2 Landis Univ.
 12"x36" Landis Plain.
 16"x50" Norton Self Cont.
 26"x120" Landis Self Cont.
 No. 16 Blanchard, Floor, M.D.
 No. 11 Landis Tool & Cutter.
 No. 55, 60 and 65 Hand Cyl.
 No. 70 Hand Internal.
 14" P. & W Surface M. D.
 No. 2 P. & S. Surface M. D.
 No. 13 B. & S. universal.

No. 103 Rivet Internal.**LATHES**

- 12"x6" South Falls, t.a.
 14"x6" Casco t.a., draw-in.
 14"x6" Monarch, q.e.g., cone.
 16"x12" South Bend.
 18"x8" Lodge & S., Cone.
 18"x8" Reed Prentice grd. hd.
 20"x10" Greaves Klumman.
 20"x10" Walcott, Cone.
 22, 24"x8" Lodge & S., cone.
 24"x12" Putnam Q.C.G., cone.
 24"x16" Lodge & S., cone.
 24"x19" American L. C. G.
 28"x12" Schumacher Boye.
 28"x17" Chard, Grd. Hd.
 30"x18" Bridgeford turning.
 30"x20" L & S, Cone, T.A.
 32"x14" Boye & Emmes, Cone.
 32"x17" Fifield, triple grd.
 32"x22" Schumacher Boye.
 36"x16" LeBlond, cone, L.C.G.
 36"x22" Pond Grd. Hd. m.d.
 36"x42" LeBlond grd. hd.
 42"x18" Pittsburgh Q.C.G. Cone.
 42"x35" Putnam Grd. Hd., m.d.
 52"x20" Gleason, Cone.
 60"x23" Putnam, Cone.
 63"x36" Pittsburg, Grd. Hd.
 72"x40" Putnam, Grd. Hd.

MILLERS, Plain

- No. 1 Cincinnati, Univ.
 No. 5 Cincinnati, Grd. Hd., P.R.T.
 No. 46 LeBlond, Geared Hd.
 Nos. 3B & 2B Milwaukee,

No. 2B Heavy P. & S S.P.D.**PLANERS**

- 84"x84"x18" S.B.P., M.D., 4
 72"x72"x14" Betts 4 bds.
 60"x60"x20" Pond, 4 heads.
 42"x36"x12" Gray.
 36"x36"x18" Sellers 4 heads.
 36"x36"x8" D. & H. Openside
 30"x30"x10" D. & H. Openside.
 30"x30"x8" Gray.

24"x24"x6" Cincinnati.**24" Lynd Farquhar Openside.****TURRET LATHES**

- 1 $\frac{1}{2}$ " & 2" P. & W's. (2).
 Nos. 2A & 3A W & S.
 3 $\frac{1}{4}$ "x36" Cincinnati, Grd. Hd.
 No. 4 Gisholt Timkin Bear.,
 Motor in base.

- No. 4 W & S Univ., Cone.
 No. 4 W. & S. univ., grd. hd.
 No. 4 W. & S. cone, screw.
 No. 5 Foster, 1-13/16" bar.
 24" Gisholt, AC M/D, 3 $\frac{1}{2}$ ".
 21" Gisholt, AC M/D, 3 $\frac{1}{2}$ ".
 24" Gisholt Cone 5 $\frac{1}{4}$ " H. S.
 2 $\frac{1}{4}$ "x24" & 3"x36" J. & L.

MISCELLANEOUS

- Rolls, 14"x1" Wickes
 No. 1 $\frac{1}{2}$ Simplex Buffalo, Bend.
 Hammer, No. 5N Nazel, M.D.
 Billet Breaking Machine, Ajax.
 Saw, 9"x36" Peerless.
 Gear Planer, 24" Gleason.
 Slotter 15"-18" Dill.

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Offices: 30 CHURCH ST., NEW YORK CITY

REASONABLY PRICED TOOLS**D-31 FOX MULTIPLE DRILL, RECT. HEAD, 16"x31 $\frac{1}{2}$ " spindle centers. Bored for 36 spindles. Has ten 1 $\frac{1}{4}$ " No. 2 Taper spindles. Power feed to head.****AUTOMATICS**, Several Model A Clevelands, from $\frac{5}{8}$ " to 3 $\frac{3}{4}$ " bar capacity.**BOLT CUTTER**, 1 $\frac{1}{4}$ " Acme single, class A; 2" Landis.**DRILLS**, 36" Cincinnati back geared, sliding head, tapping attachment.24" Edlund Production 1 $\frac{1}{4}$ " cap. power feed; No. 12 Minster H. D.

2—Spindle 20" Barnes All Geared Self Oiling M. D., 24" Barnes all geared.

3—Spindle 20" Barnes All Geared Self Oiling belt drive; No. 314 Baker heavy.

GRINDERS, 14"x72" Norton Plain; 12"x72" Landis M. D.; No. 78 W. & M. Surf. M; D.**LATHES**, 38"x14" Fifield—Cheap; 18"x8" Greaves-Klumman double b. g., quick change.**MILLERS**, No. 2B Brown & Sharpe plain, single pulley drive; No. 6 Becker Vertical with ball bearing countershaft; No. 3 Milwaukee Plain, Timken Bearings, Vertical Head, Rapid Traverse, Motor in Base; No. $\frac{1}{2}$ Van Norman, 8" P & W Automatic.**PLANERS**, 30"x30"x8" Cincinnati, two heads on rail; 36"x15" Betts, 2 heads.**PRESSES**, O. B. I.—No. 105 Bliss Consolidated, dbl. crk. incl., flywh. type, arr. for motor. No. 2 Rockford 3" stroke; No. 3 and 4 Walsh; No. 2 $\frac{1}{2}$ Robinson.**RADIAL DRILL**, 3" Prentice, gear box drive; 3" Cincinnati Bickford gr. box drive.**SCREW MACHINES**, No. 4 Warner & Swasey univ. cone head, also plain screw machine. No. 1 Brown & Sharpe wire feed; No. 4 Milholland; No. 4 Foster cone head, 1 $\frac{1}{2}$ "x9"; Acme cone head.*Many other tools—exceptional "buys"—write for full details.***A. D. White Mchy. Co., 108 N. Jefferson St., Chicago, Ill.**

America's Leading Machinery Rebuilders

BORING MILLS

Bullard, 36" New Era.
B., 36", 42", 2 hds. on rail.
Colburn 60", 2 hds.; Bullard
76" vert.
Universal, No. 3A Horl.
Rockford, No. 2, 2" bar.

DRILLS

P. & W. No. 1 Gun Barrel.
P. & W. Nos. 11, 12, 13 Mult.
Nateo Nos. 35 & 37 Mult. Sp.
American 2' Radial.
N-R-P 6' Radial, Univ.
Colb. No. 20 Mfg. H.D. S. P.
Upr. Drills—All makes & siz.
Henry & Wright, C. L. 3 Sp.
Allen 3 Spdls. & 4 Sp. B.R.
Leland Gifford 3 sp.; All p.f.
Sipp 4 S., ty. BW-4, 8" ovrg.
Detroit No. 2, 5-Spd. Hor.

GRINDERS

B.&S. No. 1, 2, 3 Univ. M.D.
Heald No. 72 Sizematic Internal
Hyd. M.D.
Bryant Nos. 6, 10A, 18A S-A.
2 Sp. Hole, No. 40 Chuck.
Disc Grind.—All makes & siz.
Gardner No. 77 Disc, M.D.
Heald No. 70, 85 Internal.
Rivett No. 6, 103 Internal.
Nort., 6x32", 10x36", 10x50",
10x72", 14x36" Pl. Cyl.
Brown & Sharpe No. 10, 11,
12, 14, 16 Plain.
Landis 6"x30" Hy. 8-C. Pl.
P.&W. 8"x30" Barrel Spot.
Blanchard No. 16 Rotary Surf.
Wilm. & Morn. No. 3 Surf.
Cinc. No. 1, 1½ Tool & Cut.
Norton No. 1 Univ. Tool & C.
Oakley No. 2 Univ. Tool & C.
Cinc. 12x36" Univ. & Plain.
Cin. 12"x18", M.D. P. C. (2).

LATHES

Hendey 14"x6" with Tap. At.
LeBlond 9"x16" Multi-Cut.
Gisholt No. 16 Simplimatic.
Sundstrand 9" M.D. Mfg.
L.&S. 16"x6" Selec. Grd. Hd.
Hendey 16"x8", 18"x8"
LeBlond 17"x16", q.e.g.;
Whitcomb-Blaisdell 18"x8",
Blaisdell 19"x17" L.C.G.
Hend. 20"x14" G. Hd., M.D.
LeBl. 21"x6" H.D., P.H.G.,
Q.C. Auto. Prod. Lathe.

New Haven 24"x10', 24"x12',
24"x20'.

American 26"x14" c.h.
Pittsburgh 30"x15" G.H. M.D.
Gisholt Type "P"—24" T. T.
B. & O. No. 4 Turret.
P.&W. 1½"x18, 2x26, 3x36 T.
W.&S. Nos. 1A, 2A, 3A Tur.
Foster No. 2B Turret.
W-F No. 3 Chucking.

MILLERS

Brown & S. No. 1½, 2A Univ.
Cincinnati No. 1½ Univ.
Van Norman No. ½, 2 Duplex.
Kemp Smith No. 1 Plain.
Garvin No. 21 Plain.
Kemp. No. 33, SPD, P. (2).
LeBlond No. 3H Plain.
Cinc. Nos. 1½, 2, 3, 4 Pl.
Becker No. 6 AB V.
Knight Nos. 1½ Vert.
Lincoln Millers of all kinds.
Hand Millers—All makes.
Gooley & E. Types A&B Brig.
Thurston Die Millers.
P.&W. 4½"x12", 6x14", 6x30",
12x48", 6x80" Thread Mil.
Lees-B. No. 8 Thread Miller.
Milw. & Garvin Cam Miller.

PRESSES

Fer. GD 54 S.S. Draw. DG 73.
Bliss No. 18, 19 & 20 O.B.I.
V. & O. No. 12, 14 D.A. C. In.
V. & O. No. 24 Punch
Far. Fdy. 4½" S. D. Pwr.
Waterbury-F. No. 4 Stat. Cut
Back Frame Power
Manv. No. 4 D.A. Pillar Crk.
Waterbury-P. 20 ton H. Sp.
Grd. Rack & Pinion Draw.
Bliss No. 61—O.B. Reducing.
C. No. 72, O.B., 74, 074 & 04.
Zeh & Hah. 8½" Percus.
Bliss No. 21, 100 ton K. J.
W-F 200 ton knuckle joint.
Bliss 7 D.B.G., S.S. Draw.
Wat.-F. No. 6 D.A. P. Cam.
Bliss No. 41 Inc. D.A. Crk.
Ferracute No. 105 D.A.
Ferr. D.G. 53 S.S. Draw.
Terkelsen D-1 150t. M. Spg.
Wat-Still. 60 ton H. Broch.
Bliss No. 73½ & 74½ S.S.
Stand. No. 4-R-S.S. Reduc.
Ferracute No. 13-P-4.
Ferracute No. D-57, S.S.
Bliss No. 4—Stiles—Punch.
Ferr. No. 53 Stiles Press.

Bliss No. 3½A & 3½B Tog.
Bliss No. 16, 4" str., Overh.
O.B.I. Trim.
Wat.-F. No. 2 Sub. Pillar.

SCREW MACHINES

Grid. 9/16" & 1¼" Mod. G.
N. Brit. No. 652 M.D. Ch.
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Angle Iron Shears, Coving., 6x4x $\frac{1}{8}$ " , dbl. end. Automatics, Brown & Sharpe, late serial No. 00G—serial No. 9900; No. 00—serial No. 9800; No. 0G over 6700.

Readers, No. 0 Nia.; 172 Nia. comb.; Quickw'k. Bending Rolls 12" Niles, $\frac{3}{8}$ " cap., pwr. elev. 5' $\frac{10}{16}$ "—4' 10 ga. 8' $\frac{3}{8}$ " Bertsch pyr. drop end.

Buffers, 3D Gardner, 5 h.p.; Hill Curtis 3 h.p. Boring mill, 36" Bullard New Era, side head. Boring mill, 88" Niles vertical,—42" N.B.P. Boring mill, horiz., 3 $\frac{1}{2}$ ' bar, univ., m. d. Brakes, box & pan, 6' 10 ga. Chicago Steel. Brakes, hand, 10' 14—8' 16, 8' 12. Brakes, power, Chgo. Steel; 10' 10 ga.; 8' $\frac{1}{4}$ "; 6' 12 ga. 12' $\frac{1}{4}$ ", pwr. clamp.

Compressor, air, 10x10 Ingersoll Rand. Drill, No. 242 Barnes Camel Back. Drill, 6 spindle Edlund, power feed. Filing Machine, No. 3 Thiel, m. d. Furnace, large elec. heat treat., pusher type. Gang Slitter, 36" Yoder; 48" Bliss. Grinder, No. 25 Heald Surf. 16" mag. chk. Grinders, Heald rot., No. 20, 22, 235, with mag chucks.

No. 3 Abrasive Surf. 84" Diamond Face. Grinder, No. 2 Gardner disc, m. d. Grinder, Landis cyl., 22" swg. x 16' 6" bet. centers, self-cont., extra wheels, fixtures.

Hammer, drop, 400 lb. Standard. Hand millers, No. 2 Kent Owens (4).

Ironworker, Univ., Schatz, 6x6 ang. Lathes, South Bend, 9'x3 $\frac{1}{2}$ '; 16' 24 ga. Lathes, 30"x16" L&S, 48"x18 Schu. & Boye.

Lathe, 36"x30" L. & S., 24' centers, q.c.g. Lathes, spin., Prybil 22", bb.; Tol. 30' bb. Millers, hand, No. 2 Kent Owens, b.b. (3).

Millers, Pl. & Vert., No. 3 Inger. 14x48 tbl. Millers, Pl., No. 3B, No. 1A K. & T., dbl. over. Millers, Univ., No. 2A B. & S., div. hd., m. d.

Millers, vert., No. 1 B. & S.; No. 2, 3, 4B, 5B Becker.

Miller, Plain, No. 4-B B. & S., m. d. Milling machine, Ingersoll planer type, with 40 h.p. motor, table 48"x22' 8".

Nibblers, Campbell No. 1 & 1B, m. d.; No. 2. Pipe Threaders, 2" to 10".

Planer, 26"x8' Cleveland, openside. Planer, 60x60x18 N. B. P., 4 hds., m. d. Punch, Sgl. End, No. 9 Beatty, cap. 2 $\frac{1}{4}$ "x1 $\frac{1}{8}$ ".

Saw, Friction, No. 1, No. 0 Ryerson & No. 2. Radial Drills, 5' & 6' American; 5' Fosdick. Rival Spinners, Grant No. 80; No. 103; No. 107.

Roller Die Machine, 6 sp. Yoder, m. d. Roller levellers, 48", 17" rolls, motor drive; 36" H. & J., 18 rolls.

Screw Mch., auto., No. 506 New Brit. 6 sp. Screw mach., auto., 4 spdle. Gridley, 1 $\frac{1}{4}$ " cap. Shapers, 16" Hendey gr. box; 16" & 24" G.&E.

Shaper, 24" Ohio Dreadnaught, tilt top tbl.

Shear, circle, No. 16A Nia., 14 ga. Shear, Pels angle & beam, 8x8x $\frac{1}{4}$ ".

Shears, throatless, 10 ga. $\frac{1}{4}$ ", $\frac{1}{2}$ ", $\frac{3}{4}$ " Shears, power, 13' $\frac{3}{8}$ " $\frac{3}{8}$ " 6' $\frac{1}{2}$ " Bertsch; 6' 10 ga.; 16' 3 $\frac{1}{16}$ ", 10' $\frac{3}{8}$ ", 10' 3 $\frac{1}{16}$ " 10' 10 ga., 10' 16 ga.

Shears, Ret. Quickwork; No. 10, 60" thr., 14 ga. Turret Lathe, No. 4A & 2A W. & S. univ. No. 6 W. & S.

Welders spot, 5, 7 $\frac{1}{2}$ ", 10, 25, 50KW; press type; 100 KW Federal; 75 KVA National.

Welders, Butt, 10 KW Thompson; 5KVA Taylo Wire Straightener, $\frac{1}{8}$ "x8"; No. 6 Wells, $\frac{3}{8}$ "x22".

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PRESSES. Straight Side, tie-rod fr.

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No. 59 $\frac{1}{4}$ Toledo, m. d., air cushion.

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No. 615-F Nic. 50x84—bed 12" stroke air cushions.

No. 8-F Bliss, 120" bet. hsgs., 20" str., spr. cushions.

No. 8-F Bliss, 120" bet. hsgs., 20" str.

No. 7-F Bliss, 96" between uprights.

Niagara No. 613, 62" between uprights.

No. 96-G Toledo, 149" between uprights, 24" str., tie-rod, wt. 162,000 lbs.

No. 17 Bliss, gap frame, 97" bed, 8" str.

Press, Wells gang, No. 12, 6" bet. housings.

Press, Arbor, No. 5 Greenerd, No. 15 Lucas.

Hvd. Watson S., 200 ton, 2-10" rams.

PRESSES. Toggle

No. 409 Bliss, 60x109, air cushion.

No. 408-B Bliss, 84" bet. upr., 58x84.

No. 3 $\frac{1}{2}$, No. 5S Bliss; No. 3 $\frac{1}{2}$ -B Bliss.

PRESSES. OBI

No. 6A Bliss, 7" st., No. 31A McDonald

auto-feed. No. 5 Nia.; No. 4 Bliss; No.

5 Toledo; No. 2 Am. Can; No. 2 Rock;

No. 3 Nia.

PRESSES. Horn

No. 24 Bliss, No. 14 $\frac{1}{2}$; Toledo; No. 116-A

Niagara; No. 41 Toledo; No. 2 and 3

Am. Can.

PRESSES. Coining

No. 666 Toledo, 1000 ton.

No. 27K Bliss 1000 ton.

630 ton Waterbury-Farrel.

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New Version All Steel, gap frame, 96", 14 ga.;

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Chicago, steel, 10' 3 $\frac{1}{16}$ " cap., m. d.

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Niles 10" vertical, 2 heads.
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American 27"x10"; 30x10".
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B. & S. Nos. 2A, 3A, 4A univ.
Brown & S. Nos. 2 & 3 univ.
Brown & Sharpe No. 1Y plain.
B. & S. Nos. 2B, 3B, 4B, 5B
plain, s. p. d.
LeBlond No. 3H, 4 Plain; c. d.
Kemp No. 3 Maxi, mtr. in base.
Cincinnati No. 4 Plain; SPD.
P. & W. 4½"x12, 6x14, 6x48,
6x80 thread.

Cincinnati 18", 24", 48" auto.
Van Norman No. 21 duplex.

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Natco Nos. 12, 13 & 22 mult. sp.
Natco C11 drill, mechanical fds.
Natco C13H drill, hyd. feeds.
Pratt & W. No. 12 rect. head.

RADIAL DRILLS

Cin. Bick. 3", 3½", 4" pl.; s. p. d.
American 4" universal s. p. d.
Mueller 4" plain; motor drive.
Dreses 5" plain; s. p. d.
Cin. Bickford 5" univ.; s. p. d.

AUTO. SCREW MCHES.

B. & S. No. 2G, No. 00G auto.
Cleveland 2", 2½" mod. A auto.
Gridley ¾", ¾", 1½", 1¾", 2½".
New Britain Nos. 24 & 12A auto.

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Barber C. Nos. 3 & 12 gr. hob.
Brown & Sharpe No. 13 gr. cut.
Gould & E. 18H, 12H gr. hob.
Cleveland 8 spindle spline hob.
Gleason 10", 15" spiral bevel.
Gleason 24" bevel gear planer.
Fellows No. 8B burnisher.
Fellows Nos. 6, 61, 515, 7, 71, 7A.
Lees Bradnerlapper, cap. 1½"x8"

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Pratt & Whitney No. 14 surface.
Heald 72-A 3 airplane cylinder.
Heald No. 72-A 3 Sierematic.
Heald Nos. 55, 60, 65, 70 inter.
Landis 6x18, 10x24, 12x36 pl.
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Landis 16x32, 16x48 crankshaft.
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21", 24" & 36" Cin. with and without
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6-ton General Flexible Power Press.
No. 4 Cons. O.B.I. b. dr., 3" stroke.
No. 13A Horsing, without table.
No. 36 Nia., flywheel in bk. arr. m. d.

306 Bliss geared 8" stroke.
95 Consolidated Flywheel.
No. 486½ Hamilton tie rod, 8" str.

MILLING MACHINES

No. 2B Brown & Sharpe Plain, M.D.
18", 24" & 48" Cin. duplex, std. and
widened pat.
Type B Godley & Edlund Production.
No. 15 Garvin Vertical.

GRINDERS

22" Pratt & Whitney Vertical.
No. 33 Abrasive, magnetic chuck.
No. 70A Heald Internal, 3 motors.
Cin. face mill, cap. 24" diam, M.D.
No. 70 Heald Int. belt & motor drive.
84A Gardner Disc, 2 opposed wheels.
64" Diamond Face, M.D.
No. 10 & No. 1 B & S. Pl. M.D.
Fitchburg semi-automatic Spline shaft.

SCREW MACHINES AND AUTOMATICS

1½" Model H 4 spindle Cleveland
Automatics, bar equipment.
No. 2A Warner & S. Univ., Serial
No. 197,000, 3 Jaw Air Chuck.

No. 4 Warner & S. Univ., C. D.
¾" Model G Gridley, 4 spdl, m. d. (2)
No. 4 Brown & Sharpe Hand.
No. 6 Warner & Swayse Power feed
to turret and cross slide.
Cleveland Model 7½", 4 spdl.
with mag. feed, M. D.
4½" Single Spindle Gridley.

BORING MILLS

No. 43 Lucas Horiz. 4½" bar, m. d.

MISCELLANEOUS

Butt welder, Federal, 75 kw., 60 cy.,
3 ph., 440 v., 3½" tubing capacity.
No. 3 Oilgear Horizontal Broach.
Double spdl. Landis horizontal threader 1½".
Filing machine, No. 3 Thiel.
Hammers, No. 4-A & 5-A high speed.
Honing machine, Footbult, sgl. spindle.
Jig borers, No. 2 & No. 3B Pratt & W.
Lathe, 16"x8" Monarch, g. h., m. d.
Lathe, 17" LeBlond Prod., g. h., m. d.
Metal band saws, Nos. 1 & 2 Klemm.
Saw, cold, 4-B Cochran & Bly.
Swedging machine, No. 5 Langelier.

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2 1/2	1/4	7/8	5.40	2.70	5	1/2		15.10	7.55
2 1/2	5/16	7/8	5.70	2.85	5	5/8		16.70	8.35
2 1/2	3/8	7/8	6.00	3.00	5	3/4		18.20	9.10
2 1/2	7/16	7/8	6.60	3.30	5	7/8		21.30	10.65
2 1/2	1/2	7/8	6.90	3.30	5			21.30	10.65
3	3/16		6.50	3.25	6	3/16		9.00
3	1/4		6.50	3.25	6	1/4		9.00
3	3/8		6.90	3.45	6	5/16		9.00
3	1/2		7.20	3.60	6	3/8		9.00
3	5/8		7.60	3.80	6	7/8		9.00
3	1		8.00	4.00	6	1 1/2		19.70	9.85
4	1/2		9.00	4.50	6	5/8		21.80	10.90
4	5/8		9.00	4.50	6	3/4	or 1 1/4	24.00	12.00
4	1		10.10	5.05	6	1	or 1 1/4	28.40	14.20
4	1 1/8		10.10	5.05	6	1 1/8	or 1 1/4	28.40	14.20
4	1 1/4		12.30	6.15	7	1 1/2	or 1 1/4	15.00
4	1 1/2		11.30	5.65	7	5/8	or 1 1/4	15.00
4	5/8		11.30	5.65	7	3/4	or 1 1/4	34.40	17.20
4	3/4		12.30	6.15	7	1	or 1 1/4	40.30	20.15
4	7/8		13.30	6.65	8	1 1/2	or 1 1/4	20.00
4	1		14.30	7.15	8	5/8	or 1 1/4	45.20	22.60
5	5/8		7.00	8	3/4	or 1 1/4	53.40	26.70
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No. 2 Kemp Smith Universal; M. D.
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Western Plain Radial, 3', 5' & 6' Motor Drive.

GEAR HOBBERS, Barber-Colman Nos. 3 and 12.

Lees-Bradner Nos. 1 and 5A.

GEAR SHAPERS, Fellows Nos. 6 and 77A.

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Norton Plain, 6" x 32", 10" x 24, 36 & 50".

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B. & S. No. 2 Surface M. D. & C. S.

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6 Spdl. Allen, 12" O. H., H. S.

Ball Bearing.

21" Roversford b. g., power

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5' Dresser Univ. rad., arr. m. d.

3 $\frac{1}{2}$ ' Fostick rad. gr. box s. p. d.

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No. 12 B-C dbl. overarm.

No. 3 Barber Colman, m. d.

No. $\frac{1}{2}$ Schuchardt & Schutte.

GRINDERS

No. 25 Heald, hyd. rotary surf.

No. 20 Heald rotary surface.

No. 72 Heald int., hydraulic.

No. 2 Gardner disc. 18", disc pr.

No. 2 B & S surf. m. d. & b. d.

No. 2-1 B. & S. universal, m. d.

Nos. 1-2-3 B. & S. univ., 3 mtr.

No. 11 Brown & S. plain, m. d.

No. 2 Norton univ. tool & cut.

No. 1 Cincinnati tool & cutter.

5 H. P., 18" Queen City Disc.

b. b., New.

LATHES

No. 2A W & S Univ. Hex. Tur.

14" x 6' Hendey, q. c. g.

14" x 6' LeBlond, q. c. g., t. a.

15" x 6' C. & J. c. hd. q. c. g., new.

16" x 6' C. & J., grd. hd., Timken

Bearing, motor in base, new.

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No. 2, Van Norman Sub Head.

No. 2, B. & S. Plain, cone head.

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No. 2A B. & S. Univ. s. p. d.

No. 2B, Brown & S. plain, m. d.

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4 $\frac{1}{2}$ " x 12" Pratt & Whitney thrd.No. 2 $\frac{3}{4}$ Rockford universal.

Model "B" Becker, h. p., vert.

No. 4B Becker, vert., b. b., spdl.

No. 3 Becker vertical.

No. 4 Hendey Norton Pl. S. P. D.

PRESSES

No. 306 Bliss Strt. Side, Sgle.

Crank, Tie Rod Const. 8" Strk.

No. 95 Bliss Gap Frame.

No. 4A Bliss horn., 4" stroke.

No. 1 & 1 $\frac{1}{2}$ Bliss Cam Dr., grd.

No. 6 Fox "Superflex".

No. 18 Bliss, o. b. i., arr. m. d.

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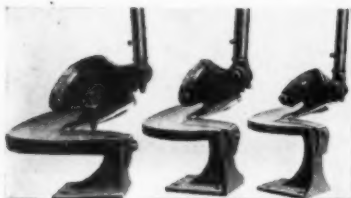
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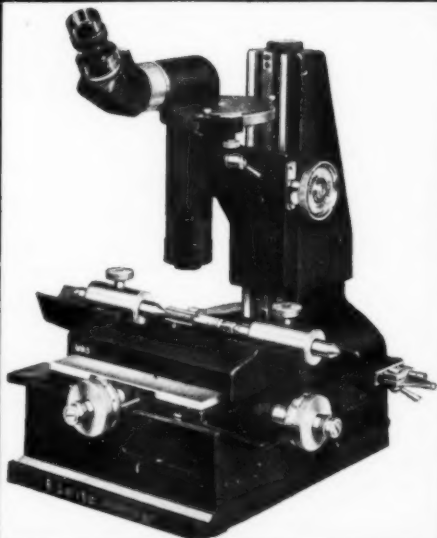
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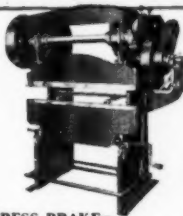
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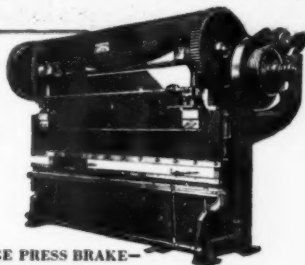
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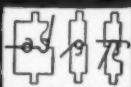
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